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ORIGINAL MEMOIRS.

THE RESULTS OF RADICAL OPERATIONS FOR THE CURE OF CARCINOMA OF THE BREAST.*

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IT is especially true of breast cancer that the surgeon interested in furnishing the best statistics may in perfectly honorable ways provide them. The most conscientious man may refuse to operate upon any but favorable cases, and, by performing an incomplete operation, exclude from his list of complete operations such bad ones as he finds himself operating upon. Or the pathologist on whom he relies may classify as carcinoma, tumors which on microscopic examination show dangerous spots—*i.e.*, a few epithelial cells here and there escaping into the stroma.

But you will concede that little notion of the value of an operative procedure can be gained unless some attempt be made to exclude or consider apart cancers so far advanced that, however radical the operation, only a portion of the disease can be removed.

The Results.—As effecting the ultimate result, the variety of the cancer, the time elapsed since its appearance, the degree of outlying involvement, the activity of the gland (lactation, age of patient), the thoroughness of the operation, are important factors.

* Read before the American Surgical Association, May 8, 1907.

There will not be time in this discussion to consider in detail each of these influences. It is the particular wish of the Society, as I have understood it, to learn the results obtained by the modern, so-called complete, operation for the cure of cancer of the breast, and it affords me the greatest pleasure to express anew my obligation to Dr. Bloodgood for his efficiency and inexhaustible zeal in collating facts year after year for so many years, and to thank Mr. Schapiro for his invaluable assistance in tabulating from many points of view our results. I am exceedingly indebted also to the many physicians who have ardently assisted us in the search for data concerning their patients.

I ask your attention to the Tables. According to the plan of operation the cases have been divided into five groups; of these only three concern us to-day. In Group I are the cases in which, at the one occasion, the complete subclavian and neck operations were performed; in Group II, the cases in which at the first operation the complete pectoral or subclavin, and at a second the supraclavicular or neck part was performed; in Group III, those in which only the complete pectoral operation was done, the neck being unexplored. The small letters, *a, b, c, d,* indicate, approximately degrees of axillary involvement; *a,* signifying that the base or lowest part only of the axilla was implicated; *b,* involvement of the midaxilla as well as of the base; *c,* involvement, in addition, of the highest glands of the surgical axilla; and *d,* that the subclavian vein was involved or intimately adherent to the glands.

In the Tables here presented are included only the cases in which nothing less than the complete subclavicular operation was done and only those operated upon three or more years prior to the last news received of them. Excluding 65 cases in which, necessarily, an incomplete operation was performed there remain for study of the cases operated upon at the Johns Hopkins Hospital 232. The result in 18 of these we have been unable to determine. In calculating the percentage of cures untraced cases should be figured as dead of the disease.

In Tables II and III the ultimate results are considered

in relation to the glandular involvement, and in Table II in relation also to the particular operation performed. In 64 of the 232 cases glandular involvement was not discovered; nevertheless in 15 of these (23.4 per cent.) there was metastasis or recurrence of some sort sooner or later; in 6, metastasis three years after operation. It is interesting to note how late the

TABLE I

Carcinoma of the Breast.—Pathologic varieties.

	Number of cases.	Cured cases.	Per cent.
Cancer cysts	6	2 (1?)	33.3
Adenocarcinoma	32	24	75.0
Medullary carcinoma	25	12	48.0
Circumscribed scirrhus	28	13	46.4
Small infiltrating scirrhus	80	30	35.5
Large infiltrating scirrhus	39	8	20.5
Total	210	89	

SYMBOLS USED IN THE TABLES.

Complete axillary operation { Group I, Supraclavicular glands removed at 1st oper. / Group II, Supraclavicular glands removed secondarily. / Group III, Supraclavicular glands not removed.

Letters *a*, *b*, *c*, *d*, indicate degree of axillary involvement:
a, Base of axilla only.
b, Base and midaxilla.
c, Base, midaxilla and apex.
d, Veins intimately adherent.

metastasis occurred in these cases with undetected axillary involvement; another argument for wide operating. Forty-five of the 64, or 70 per cent., of the cases with undemonstrated glandular involvement are tabulated as cured, and 51 of the 64, or 80 per cent., were free for three years from signs of the disease. We must bear in mind, however, that surely in some and probably in many if not in most of the axillæ recorded as negative there was disease.

Of 110 cases with axillary involvement and negative neck, 27 cases, or 24.5 per cent., are cured for periods ranging from 16 to 3 years. Adding 11 untraced cases with axillary involvement to the 110 in which the result is definitely known,

reduces the percentage of cures in this category to 22.4 per cent.

The fact that in this country at least a number of the leading surgeons of the generation prior to mine made the pronouncement that they had not in their lifetime cured a single case of breast cancer notwithstanding the fact that they removed the entire breast, a liberal piece of skin, and after a fashion, some axillary glands, is strong presumptive evidence that in almost every instance the cancer, as then recognized, had entered the lymphatic vessels. As further proof of this is

TABLE II

Carcinoma of the Breast.—Cases operated upon 3 or more years prior to last news of them.

Ultimate result as affected by degree of axillary involvement.	Axilla only involved.				Axilla and Neck involved.				Totals
	a	*b*	*c*	Total	*b*	*c*	*d*	Total	
CURED, living 1906–1907	6	..	..	6	..	..	1	1	7
CURED, living in 1905	3	3	..	6	..	..	..	..	6
CURED, dead of other causes 3 years +	..	2	2	4	1	1	..	2	6
CURED, dead of other causes 3 years —	..	..	1	1	..	..	..	..	1
Actual cures	9	5	3	17	1	1	1	3	20
WELL 3 years, metastasis later	1	4	..	5	..	1	1	2	7
Cured 3 years and over	10	9	3	22	1	2	2	5	27
DEAD, local recurrence	1	3	3	7	1	6	1	8	15
DEAD, regionary recurrence	5	4	6	15	2	7	2	11	26
DEAD, internal metastasis	5	13	5	23	1	9	5	15	38
Cases not cured	11	20	14	45	4	22	8	34	79
Cured 3-year cases	10	9	3	22	1	2	2	5	27
Postoperative deaths	..	..	..	3	..	..	..	1	4
Untraced	..	..	..	11	..	..	..	3	14
No data as to extent of axillary involvement	..	..	..	43	..	..	..	1	44
	21	29	17	124	5	24	10	44	168

our observation that even in the cases with microscopically negative axilla, and notwithstanding our extensive operation, there is death from metastasis in 23.4 per cent.

Fortunately we no longer need the proof which our figures so unmistakably give that the slightest delay is dangerous and that, other things being equal, the prognosis is quite good in the early stage of breast cancer, two in three being cured, and bad, three in four succumbing, when the axillary glands are demonstrably involved. We find encouragement for our operative

TABLE III

Carcinoma of the Breast.—Cases operated upon 3 or more years prior to last news of them.

Ultimate result as affected by axillary and neck involvement.	Glands of axilla and neck negative.				Glands of axilla positive, glands of neck negative.				Glands of axilla and neck postive.			Totals.
	I.	II.	III.	Total	I.	II.	III.	Total	I.	II.	Total	
CURED, living: heard from in 1906-1907	4	1	20	25	4	..	5	9	..	1	1	35
CURED, living: heard from in 1905	4	2	7	13	4	..	3	7	..	..	..	20
CURED, dead of other cause more than 3 years post op.	4	..	3	7	4	..	3	7	1	1	2	16
CURED, dead of other cause less than 3 years post op.	..	..	..	..	1	..	3	4	..	..	..	4
Cases actually cured	12	3	30	45	13	..	14	27	1	2	3	75
CURED 3 years after operation, metastasis later	1	..	5	6	3	..	4	7	1	..	1	14
Cases cured not less than 3 years	13	3	35	51	16	..	18	34	2	2	4	89
DEAD, local recurrence	..	..	..	..	5	..	11	16	6	4	10	26
DEAD, regionary recurrence	1	..	3	4	13	1	7	21	5	5	10	35
DEAD, internal metastasis	2	..	3	5	15	1	23	39	14	2	16	60
Cases that have not been cured	3	..	6	9	33	2	41	76	25	11	36	121
Cases cured 3 years and more, as above	13	3	35	51	16	..	18	34	2	2	4	89
	16	3	41	60	49	2	59	110	27	13	40	210
Postoperative Mortality	..	..	..	..	2	..	1	3	1	..	1	4
Untraced	..	..	4	4	3	..	8	11	3	..	3	18
	16	3	45	64	54	2	68	124	31	13	44	232

and laboratory labors and to increased endeavor quite as great from the relatively poor results obtained in the advanced cases as from the more favorable outcome in the cases in which no involvement of lymphatic glands was detected.

The neck operation was done in 101 cases primarily and in 18 secondarily. In 113 of the 232 cases the supraclavicular operation was omitted. In 44 patients the glands of the neck as well as of the axilla were involved. Three of these, or 7 per cent., were, it seems, definitely cured. One is still living, twelve and a half years since the operation; a second lived six years and died of diabetes; a third, three and three-quarter years without signs of return, died of acute pneumonia; and in a fourth, after three years of apparent freedom, the disease re-manifested itself. We have reason to be quite certain that there

TABLE IV

Carcinoma of the Breast.—Study of cured 5-year cases. (To January, 1907.)

	Cases.	P.O.D. and lost.	No. of cases.	Cured, living.	Cured, dead.	Metast. after 5 years.	Total.	Per cent.
Group I.....	96	8	88	13	6	5	24	27.27
Group II.....	16	..	16	3	1	1	5	31.25
Group III....	92	5	87	23	3	4	30	34.48
	204	13	191	39	10	10	59	30.89

was also involvement in some of the necks reported as negative.

Before accepting the statement of any one that he has cured a case of breast cancer with neck involvement, incontrovertible proof should be demanded. I confess that even if the microscopic findings were confirmed by an able pathologist I should still feel that an error might have occurred, for example, in the labeling of the specimen. The naked eye diagnosis of the surgeon should count for nothing unless he is a sound pathologist and the macroscopic findings are specifically detailed. Inflammation may produce appearances in lymphatic glands quite indistinguishable macroscopically from carcinoma, whether medullary or scirrhous. If the deposit is described as sharply outlined against the more normal portions of the gland, particularly if cortical, the observation deserves consideration. We

should demand as further proof of cure in these positive neck cases that the patient live at least five years after the operation, or negative autopsy findings, a year or perhaps even two years thereafter. With these stipulations fulfilled I should still be sceptical as to the cure. Cancer was diagnosed both macroscopically and microscopically in the three cases of cure claimed by us. But even without the proof which we offer, it is, I think, incumbent upon the surgeon to perform in many cases the supraclavicular operation. He should surely perform it, barring, of course, special contraindications, (1) in all cases with palpable, operable, neck involvement; (2) when the apex of the surgical axilla is involved. When midaxillary involvement is demonstrable at the operation apical implication is almost certain, and hence (3) in these cases also the neck should be typically cleaned of its lymphatics, as high, at the very least, as the bifurcation of the carotid.

We find ourselves for the past two years again performing the neck operation in most cases. We omit it in hopeless cases, in most "duct cancers," and in some carcinomata of emphatically adenomatous type in which the axilla at operation is not macroscopically involved.

To determine the relation of supraclavicular to subclavicular involvement detailed observations at the operating table with especial reference to this point must be made; and almost endless laboratory work is necessary. To be able to assert with any degree of positiveness that the axilla and neck are negative involves infinite toil. The findings at operation must be recorded on charts designed especially for this purpose; and a laboratory enthusiast of a rare type is indispensable.

For the greater convenience of the reader the following summary is given. Of the 232 cases considered, 18 remain untraced. Of the 210 traced cases we accept as *cured:*

35 cases reported living in 1906–1907	16.6 per cent. of 210
20 cases reported living in 1905	9.5 per cent. of 210
16 cases known to have died of causes other than carcinoma of the breast three or more years after the operation	7.9 per cent. of 210

4 cases dead of other disease, less than three years post op., in which the cure was demonstrated by autopsy ..... 1.9 per cent. of 210

Total, cured, 75 cases = 32.3 per cent. of 232, and 53.6 per cent. of 210

In 14 cases metastasis appeared after three years; in one instance manifesting itself as late as eight years and in two instances more than six years after the operation. Thus, 89 cases (42.3 per cent. of 210, and 38.3 per cent. of 232), were apparently cured for three or more years.

In the 210 traced cases the condition of the axilla and neck as regards glandular involvement was as follows:

		Cured.	Per cent.	Cured 3 years.	Per cent.
Axilla and neck negative	60 cases	45	= 75	51	= 85
Axilla positive, neck negative	110 cases	27	= 24.5	34	= 31
Axilla and neck positive	40 cases	3	= 7.5	4	= 10
Total	210				

The Mortality.—Four of the 232 patients died in the hospital, a mortality of one and seven-tenths per cent. The group apportionment of the deaths is as follows:

Group I; .....in 101 cases, 3 deaths = 3 per cent.
Group II; .....in 18 cases, 0 deaths = 0 per cent. } 2.5 per cent.
Group III;.....in 113 cases, 1 death = .88 per cent.

Thus it would seem, without particulars, that the neck operations were responsible for the greater mortality, Groups I and II yielding a two and one-half per cent. death rate, and Group III, in which the neck operation was omitted, a mortality of hardly one per cent. But two of the deaths in the neck cases were clearly due to an avoidable error, quite independent of the operation. These two patients, operated upon just twenty-four hours apart, were convalescing normally until the first dressing, which was made in both cases the same day and hour, respectively eight and nine days after the operation. Within a few hours of the dressing each patient had a chill with high temperature. The skin grafts and wound, which in each had a perfectly normal appearance at the time of the dressing,

rapidly acquired the features so characteristic of general infection. Excepting these two cases, the mortality in the patients with neck operation becomes .99 per cent., only a shade more than in the cases with axillary operation alone, in which it is .88 per cent.

Recurrence and Metastasis.—We know little of what is going on under the skin along the fascial planes even when our attention is drawn to the disease by the appearance, here and there, of cutaneous or subcutaneous nodules at long distance from the primary tumor. I recall distinctly one case and less distinctly one or two other cases of intestinal and peritoneal cancer in which general metastasis was believed, erroneously I think, to have occurred by way of the blood-vessels, although the only evidence of metastasis were numerous subcutaneous and fewer cutaneous nodules situated chiefly over the abdomen and confined altogether to the trunk or to the trunk and its immediate vicinity. Although it undoubtedly occurs, I am not sure that I have observed from breast cancer, metastasis which seemed definitely to have been conveyed by way of the blood-vessels; and my views as to the dissemination of carcinoma of the breast accord so fully with Handley's [1] that I may, in justice to him, who has formulated and expressed them so well, quote now and again from his admirable chapters. "In showing that cancer cells in the blood excite thrombosis, and that the thrombus as it organizes usually destroys or renders them harmless, Goldmann and Schmidt seem to have established a fact of primary importance and one which is strongly opposed to the embolic theory as applied to carcinoma." We believe with Handley that cancer of the breast in spreading centrifugally preserves in the main continuity with the original growth, and before involving the viscera may become widely diffused along surface planes.

Statistics obtained from many sources indicate that bone metastasis in cases of breast cancer occur, as phrased by Handley, very rarely in areas not actually invaded by the subcutane-

[1] Handley. Cancer of the Breast and its Operative Treatment, London, 1907, (W. Sampson).

ous nodules. As is well known, the sternum, ribs, spinal column, femur, and humerus, and perhaps also the skull, are the bones most frequently attacked in cases of breast cancer. Distal to the elbow and knee the bones escape, except in rare instances, cancerous invasion. We have in our cases no record of bone involvement below these joints. "The liability of a bone to cancerous metastasis increases with its proximity to the site of the primary growth." Figs. A and B (Handley) graphically represent the coincidence of the areas liable, respectively, to bone metastases and to subcutaneous nodules.

In that metastases occur both in general and in the special case only in bones which lie in the area invaded by subcutaneous nodules there is signified a relationship between the two, "between the bone deposits and the subcutaneous nodules." The dissemination probably takes place by way of the lymphatics—not by the blood-vessels—and the disease holds together without important interruptions. It permeates to the bone rather than metastasizes to it, and, via the lymphatics, along fascial planes. Much evidence has been adduced by others, and most convincingly by Handley, to indicate that the centrifugal spread of breast cancer takes place primarily in the plane of the deep fascia. If the bones are invaded by way of the lymphatic plexus of the deep fascia the first attack should fall on the spot nearest the deep fascial lymphatics—nearest the surface; in the case of the femur, at the great trochanter; of the humerus, at or below the insertion of the deltoid; and such seems actually to be the case.[2]

There is then a definite, more or less interrupted or quite uninterrupted, connection between the original focus and all the outlying deposits of cancer, "the centrifugal spread annexing by continuity a very large area in some cases." Thus the liver may be invaded by way of the deep fascia, the linea alba and round ligament,[3] "the brain by the lymphatics accompanying the middle meningeal artery."

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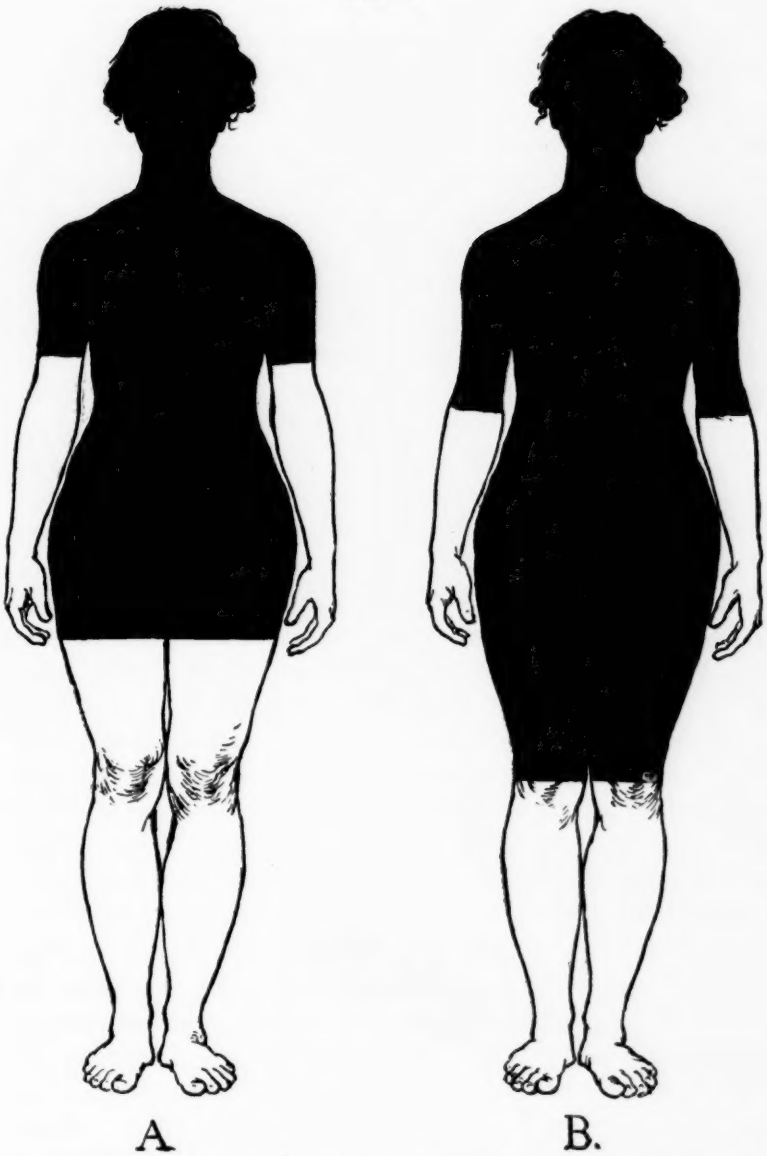
[2] Handley, loc. cit.

[3] Handley furnishes convincing proof that the liver may be invaded via the linea alba and round ligament.

CHART I.



"Diagrams showing the maximal distribution areas of subcutaneous nodules and of metastases in bone in cases of mammary carcinoma. The black area in A is the area liable to subcutaneous nodules, that in B is the area within which bone metastases occur." Handley.

Cancer Cysts.—At some other time we may consider in detail the cancer cysts, but at present can only speak of the difficulty in recognizing them and the hopelessness of the prognosis if their character is not suspected by the surgeon at the operating table. "By the surgeon," I say, for unless the operator espies the hardly discernible changes in the delicate wall of the cyst it will not occur to him that it is worth while to submit a piece for immediate examination by the pathologist. If he is able to recognize the barely perceptible thickening, the slight lack of lustre, the faintest possible difference in color and in texture, he will probably make the diagnosis without microscopic assistance. Blood-stained fluid should arouse one's suspicions, but there may be no staining of the cyst-content. Every portion of the wall should be scrutinized, particularly the base of the not infrequent papilloma. The prognosis is quite hopeless if the diagnosis is not made at the operating table. I failed to make it in the first case and possibly in the second, although I have the impression that my suspicions were aroused in the second case, operated upon many years ago. In all the clinically undiagnosed cases the nature of the cyst was soon discovered by the microscope, and in all, more or less promptly, a second operation performed; but, alas, performed in vain. The cases saved are only those in which at the operating table the correct diagnosis was made. Further proof of the necessity of making the correct diagnosis at the time of operating is not needed. The prognosis in these cases of cancer cyst, the earliest recognizable cancers, perhaps, is excellent if the nature of the disease is perceived at the table; hopeless, so far as our statistics are concerned, if it is not. Do we require more definite proof than this that the first operation is responsible for the inefficacy of the second? The precise means by which the first renders the speedily following second operation futile is not perhaps altogether clear. The partial operation (the first) certainly disseminates the cancer, which the complete operation (the second) in the primarily diagnosed cases of cancer cyst has not in our experience done. Furthermore, dissemination takes place probably by routes not already

travelled by the cancer cells and not commonly travelled by them in the early unoperated cases. Probably by these unusual routes the disease soon reaches parts outside the domain of the operation and so escapes eradication.

The Diagnosis.—It is not expected of me in this report to touch upon the diagnosis of breast cancer; furthermore it is considered a trite subject, one to which little can be contributed. But for me interest in the diagnosis of difficult cases increases, and with it the conviction that, really, something remains to be said and done. It well repays the experienced surgeon to spend perhaps an hour in the examination of certain breasts. The diagnosis has usually been exceedingly and unfortunately simple. But women are now presenting themselves more promptly for examination, realizing that a cure of breast cancer is not only possible, but, if operated upon early, quite probable. Hence the surgeon is seeing smaller and still smaller tumors, cancers which give not one of the cardinal signs. About as difficult a case as any, excepting, of course the adenoma in a transitional stage, is a tiny retromammary adenocarcinoma or a colloid carcinoma in a breast covered with one or more inches of fat. If in such a case there should be no shortening whatever of the trabeculæ the diagnosis could hardly be made. The fat on pressure being elastic and the tumor so deep, the differential diagnosis from cyst might not be possible. But given even very slight shortening of the trabeculæ from tumor to skin, this fact might be determinable by making both breasts take the widest possible excursions on the chest wall, under the skin. The faintest conceivable trace of a difference on the two sides, in a minor pectoral crease, for example, may suffice for the diagnosis. Raising the skin over the tumor with the fingers to ascertain the relative length of the trabeculæ is too crude a method, and in no case serviceable unless the tiny growth is directly under or close to the nipple; for if the test applied in this way gives a positive result there is so much shortening of the trabeculæ that the slightest displacement of the breast would reveal it. I have occasionally noticed that of my assistants, perhaps one

or two will see a trace of asymmetry in the skin tug on extreme displacement which the others are wholly unable to make out; and I have more than once in just such case of difference of opinion performed the complete operation for very small, deep-seated cancers without exploratory incision. Frequently there is no sign but this almost imperceptible suggestion of pull, which, when the faintest possible, is of course elicited by dislocation in one direction only. This sign, however slight, is all that is needed for the diagnosis. Practice in the examination of such cases, doing one's utmost to get such evidence, is most highly rewarding. Any breast if displaced far enough will, of course, tug, in a way, on the skin; it is only under the most accurate control with the other breast that its significance in difficult cases may be estimated. It will seem to some that I am wasting many words to tell what every surgeon knows; but to me, at least, the extreme possibilities of this test were not fully realized a decade, perhaps, ago, and each year I believe it develops a little in refinement. The ability to determine elasticity, the elasticity of a small cyst, as hard, almost, as bone, comes to some earlier than to others; but to me, if it has come at all, it came only with long practice. In the breast a difficulty arises from the fact that a tense cyst makes itself felt such considerable distance in the surrounding mammary tissue, particularly if the breast is very fibrous. A nodule seemingly as large as a pea to palpation may be caused by a cyst no larger than a small pin-head, and a cyst almost microscopic may, by the pressure which it exerts in the dense fibrous tissue of the breast, occasion a definitely palpable, quite circumscribed hardness. It should impress the uninitiated to witness the ability of the demonstrator to diagnosticate with the fingers through considerable fibrous tissue these hardly visible cysts yielding on puncture the tiniest fraction of a drop. The general nodular feel of a fibrous mamma in situ or on a tray depends largely upon small to tiny foci of parenchyma which are most readily recognized by the finger when a little fluid (the minutest particle suffices) is retained under tension.

The firm, circumscribed pressure exercised in the effort to determine the elasticity of a tumor occasionally ruptures, I believe, the capsule of a fat lobule. In three instances, while making this test, a peculiar sensation has been communicated to the fingers which I attributed in the first instance, and with considerable apprehension, to rupture of a cystic portion of a colloid cancer which I believed to be under examination. The cause of this perfectly unmistakable sensation which must, one feels, be accompanied by a nonaudible sound (onomatopoetically, geräusch), we have been unable definitely to determine. It is due to the crushing or rupture of something, certainly not of a cyst, and I have noted this sign only in fat people.

The size of the breast relative to that of the other side should of course be determined; but it is important to note most carefully the relative amount of uninvolved mammary gland remaining—relative to the amount in the other breast and to the size of the new growth.

Given a carcinoma, say one-half or one-quarter as large as the palm of the hand, if this tumor has grown not at all or little at the expense of the breast—and this is ascertained by making the comparison just advised—the prognosis is relatively good; for the tumor in such case is quite surely of a definitely adenomatous type and not of the scirrhous variety.

There can be little doubt, in my opinion, that a scirrhous cancer represents only a part of what has existed. The struggle against the cancer cells, resulting in fibrous tissue production, is quite surely not always futile, and when the minute foci of cancer epithelium have been destroyed, the new fibrous tissue may in part be absorbed also. Thus the scirrhous disease may be active and metastasis take place a long time before the visible or palpable tumor is developed. It would undoubtedly be possible for the expert to discover of the scirrhous growth earlier stages than he encounters, but unfortunately the tumor must first be recognized by the patient, and a scirrhous cancer large enough to attract her attention has quite surely already gone afield. Our problem, therefore, is to discover these tumors before the afflicted one can do so. Shall we let women

know that a dangerous process may be going on which they cannot detect, and keep them in a constant state of apprehension, or shall we encourage them to seek "expert" advice which may be insufficiently expert, and expose them to the annoyance of repeated and useless examinations, each of which for only a brief period, if at all, would bring a measure of reassurance?

The Operation.—Though the area of disease extend from cranium to knee, breast cancer in the broad sense is a local affection, and there comes to the surgeon an encouragement to greater endeavor with the cognition that the metastases to bone, to pleura, to liver, are probably parts of the whole, and that the involvements are almost invariably by process of lymphatic permeation and not embolic by way of the blood. Extension, the most rapid, taking place beneath the skin along the fascial planes, we must remove not only a very large amount of skin and a much larger area of subcutaneous fat and fascia, but also strip the sheaths from the upper part of the rectus, the serratus magnus, the subscapularis, and at times from parts of the latissimus dorsi and the teres major. Both pectoral muscles are, of course, removed.

A part of the chest wall should, I believe, be excised in certain cases, the surgeon bearing in mind always that he is dealing with lymphatic and not blood metastases and that the slightest inattention to detail, or attempts to hasten convalescence by such plastic operations as are feasible only when a restricted amount of skin is removed, may sacrifice his patient.

It must be our endeavor to trace more definitely the routes travelled in the metastases to bone, particularly to the humerus, for it is even possible in case of involvement of this bone that amputation of the shoulder joint plus a proper removal of the soft parts might eradicate the disease. So, too, it is conceivable that ultimately, when our knowledge of the lymphatics traversed in cases of femur involvement becomes sufficiently exact, amputation at the hip joint may seem indicated. The operation might with advantage be considered in greater detail, and I hope in the near future to have the opportunity to do so.

As to the closure of the wound I should not care to say "Beware of the man with the plastic operation." The surgeon should familiarize himself with the principle of the one or two particular plastic operations which make the best use in the simplest manner of any redundant or easily glideable skin, as of the axillary flap, that he may be prepared in any case to utilize in combination with skin grafting such feature as seems applicable. But to attempt to close the breast wound more or less regularly by any plastic method is hazardous and, in my opinion, to be vigorously discountenanced. The oval flap, whatever the direction of its long axis, removes, so far as the cure of the disease is concerned, a circle of skin whose diameter is not greater than the short axis of the oval. I still believe in the removal of a very large circle of skin and endorse the remark of my ex-house surgeon, Dr. Follis, that the operator whose duty it is to close the wound should not be entrusted with the planning of the skin incision. Skin grafting well done consumes few minutes; as a method it adds little, if at all, to the period of convalescence except so far as very early arm movements are concerned, and nothing to the mortality. I grant that to cut the grafts well, much practice is necessary, and the skill acquired by some is so great that I intrust this part of the procedure to the dexterous house-surgeon. Thiersch grafts from the thigh are commonly cut as large as a good-sized hand. One such graft may be sufficient to cover the defect; more than two large grafts are not often required. The silver foil dressing for the grafts, used at the Johns Hopkins Hospital for so many years, seems quite ideal.

Occasionally, and happily with increasing frequency, an incision for diagnostic purposes has to be made. Great care should be exercised to make these exploratory cuts no deeper than is absolutely essential. Rarely is it necessary to carry the knife *into* a cancer, for on exposure of the subcutaneous fat the tell-tale drawing of the fibrous tissue is revealed; sometimes the fat must be cut into for a little distance. If the growth is not malignant the incision should usually pass through it.

Caustics.—I am indubitably convinced that the local and regionary recurrences after incomplete operations, which come as a rule with amazing rapidity when the knife has been used, are, to say the least, relatively late in making their appearance when chemical or actual cauterization has been employed. I have several times had occasion to operate upon cancers which had been vigorously and repeatedly treated with caustics, and to note the comparatively admirable condition, the freedom from cancer permeation, of the surrounding tissues and of the axilla; whereas, after incomplete operations with the knife the local manifestations of recurrence were almost invariably deplorable and the prognosis, of course, invariably hopeless.

It was my practice at one time in making the exploration in doubtful cases to excise a portion of the breast tumor with the Paquelin cautery to prevent the wound-inoculation which I feared might take place if the knife were used. The excision of a specimen for macroscopic or microscopic examination is never resorted to except just before operation. If the actual cautery for any reason is not used, the wound is immediately cauterized with carbolic acid. All incomplete operations for cancer should, when feasible, be made with the Paquelin or actual cautery.[4] The Paquelin is ideal for the removal of cutaneous nævi, particularly of the melanotic variety. I doubt if any melanotic tumor of the skin should be removed with the knife.

Cancerous Axillary Glands with Non-demonstrable Cancer of the Mamma.—I have twice seen extensive carcinomatous involvement of the axilla due to mammary cancer which, latter, in neither instance became demonstrable for a considerable period after the axillary glands had attained conspicuous dimensions. In each case the "axillary tumors" had been removed, in one of them a year before and in the other per-

[4] I was greatly pleased to note, during a recent visit to Rochester, Minnesota, that Drs. William and Charles Mayo make extensive use of the actual cautery in operations upon cancers incurable by the knife, and to have them indorse the view, so long maintained by me, that there is relative immunity from local metastasis with the employment of the cautery.

haps two years prior to my first examination, which, though made in the most careful manner, failed to find the slightest evidence of cancer of either breast. In the course of a few months, thereafter, the mammary disease manifested itself in both patients.

A third patient was operated upon, for enlarged glands of the axilla about two and a half years before she consulted me concerning the local, axillary, recurrence of the disease, and more especially to be relieved of severe neuralgic pains in the arms and legs. In this woman I found a large mass of axillary glands which proved later to be cancerous, but nothing in the breast except a quite indefinite parchment-like induration at the base of the nipple which was retracted not at all or merely to a barely appreciable degree. With performance of the complete breast operation the pains in the extremities which distressed her greatly, vanished.

Disseminated Pains Which Would Seem to be Caused Occasionally by the Toxines Generated in the Course of the Growth of Cancer.—Distressing pains in the knees, the legs, the back, the arms, so severe and so located as to suggest cancerous involvement of the vertebræ have in two cases operated upon by me at the Johns Hopkins Hospital disappeared on removal of the growth which in one instance was large, ulcerous and foul smelling, in the other (the case cited at the end of the preceding paragraph), consisted merely of a large mass of glands in the axilla.

Reactionary Œdema in Mammary Cancer.—Quite recently I was privileged to see a condition of board-like œdema limited in a general way to the pectoral region of one side. There was no definitely appreciable abnormality of the mamma other than the œdema in the area of which it was included; and not until perhaps six months after the first manifestation of this œdema was there the least evidence of neoplastic disease of the breast. Then, as in my experience, is usually the case in the presence of excessive œdema of reaction, the cancer made very rapid strides.

END RESULTS OF 376 PRIMARY OPERATIONS FOR CARCINOMA OF THE BREAST AT THE MASSACHUSETTS GENERAL HOSPITAL, BETWEEN JAN. 1, 1894, AND JAN. 1, 1904.*

BY ROBERT B. GREENOUGH, M.D.; CHANNING C. SIMMONS, M.D.; J. DELLINGER BARNEY, M.D.,

OF BOSTON, MASS.

At the request of Dr. Leconte, and of Dr. Warren, we have determined the results of operations for breast cancer, at the Massachusetts General Hospital, for the ten years prior to January 1, 1904.

This investigation was undertaken with the assent and approval of the members of the hospital staff, and with the assistance of the administrative officers of the hospital, 376 cases, or over 90 per cent. of the total of 416 primary operations performed during the ten years, have been followed to a definite end result.

As the returns came in the results were assembled in five classes, viz.: (1) Alive and well, (2) Alive with recurrence, (3) Died of operation, (4) Died without recurrence over three years after operation, (5) Died with recurrence; and from the proportion of these results the percentages were calculated. Cases dying of other diseases within three years of operation were either thrown out entirely or classed as failures; there were 28 cases of doubtful recurrence; these were cases of apoplexy, meningitis, pneumonia, gastro-enteritis and other diseases which, occurring after operation for breast cancer, raise strong suspicion of internal metastasis. It is probable that a certain number of these cases were actually free from recurrence, but to err on the side of safety they have been classed as failures.

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* Author's abstract. Read by invitation before the American Surgical Association, Washington, May 8, 1907.

Of the 376 traced cases of primary operation, 64 are now alive and well at periods of from three to thirteen years after leaving the hospital. The relative freedom from disability of this group of cases is very gratifying. Almost every patient had good or perfect use of the arm on the affected side, and only one complained of a stiff shoulder, and that a case in which the wound went badly septic.

In about one-third of the cases, mention is made of a certain amount of swelling of the arm, and less frequently of the hand. It is encouraging to feel that this swelling is not invariably a sign of return of the disease.

There were 7 cases included in the group of those dying over three years after operation without evidence of recurrence: 2 died of debility and old age; 2 died of consumption; 1 died of apoplexy six years after operation after recovering from a previous apoplexy three years before; 1 died of acute renal disease, and 1 died in the hospital of pneumonia, with an autopsy to confirm the absence of recurrence.

These two groups, 64 cases alive and well, and 7 dead without recurrence, over three years after operation, form the 71 "successful" cases.

The *operative mortality* of the whole series of 416 cases was 15, or 3.6 per cent. The causes of death were: Pneumonia, 6; pulmonary embolism, 2; hæmorrhage and shock, 4; sepsis, 3.

The operative mortality was highest after palliative operations.

Following the method adopted by Dr. Halsted we have arranged this report under the following headings: (1) Extent of Involvement, (2) Variety of Cancer, (3) Duration of Disease, (4) Magnitude of Operation.

The *Extent of Involvement* we have found somewhat difficult of determination, but we have attempted to express it under the following conditions.

1. *Adherence of the tumor to the skin.* This was present in 262 cases, with 16 per cent. successful operations, and absent in 71 cases, with 32 per cent. of freedom from recurrence.

The chances of relief appear to be twice as good as when the skin is not adherent to the tumor.

2. *Adherence to chest wall* occurred in 45 cases with 11 per cent. successful results. No adherence was detected in 194 cases, with 21 per cent. free from recurrence. Again the chances of recovery appear to be nearly twice as great when the tumor is not adherent to the chest wall.

3. *Enlarged glands in the axilla* were felt before operation in 236 cases with 12 per cent. freedom from recurrence. No glands were felt in 117 cases with 29 per cent. successful results. This suggests that absence of palpable enlargement of the axillary glands is a favorable indication, in spite of the fact that the glands removed as a routine measure are almost invariably found to be malignant.

4. *Palpable enlargement of the glands above the clavicle* occurred in 40 cases, of which only 2 survive, and those were cases in which the enlarged glands were removed and found not to be cancerous on microscopic examination. No case recovered in which palpably enlarged cancerous glands were detected in the neck.

5. *Involvement of both breasts,* which occurred in 6 cases, was invariably fatal.

6. *Ulceration of the tumor* is also of bad prognostic import. Of 60 cases, in which the tumor had progressed to ulceration, 6.6 per cent. recoveries took place, while of 316 cases in which no ulceration was present, 21 per cent. were free from later recurrence.

The varying degrees of malignancy of the different varieties of cancer of the breast has received attention from many writers. Of our total of 376 cases analyzed, in all but 39 the report of a pathologist upon the tumor was available. It is probable that nearly all of the tumors were examined, but some of the reports could not be obtained from the records. One hundred and twenty-seven reports gave "cancer" only as the diagnosis, without specifying the variety.

The percentage of successful cases for the different varieties of carcinoma was as follows: 1. Medullary carci-

noma, 16 per cent.; 2. Scirrhus carcinoma, 23 per cent.; 3. Adenocarcinoma, 47.6 per cent.; 4. Colloid, 66 per cent.; 5. Paget's Disease, 12½ per cent.; 6. Cancer in the lactating breast, 28 per cent.

The numbers of cases of Colloid, Paget's and Lactation Cancer are too small to permit of very positive conclusions; although the supposed low degree of malignancy of colloid cancer is substantiated. The difference between medullary, scirrhus and adenocarcinoma, however, is striking, and in accord with previous observations. Medullary cancer is the most malignant, and adenocarcinoma is relatively benign. The malignancy of scirrhus cases in this series is perhaps greater than has been estimated by other writers; it is much more grave than adenocarcinoma, though not so serious as medullary.

Duration of the Disease.—The study of the duration yielded no conclusive results. In the individual case there is no question but that the duration is of the greatest significance, but when taken in connection with other more significant factors, such as the extent of involvement and the variety of cancer, the effects of duration seem to be obscured. Freedom from recurrence was obtained equally in cases of long and those of short duration.

The operations performed upon these cases were divided into four groups—Complete, Semi-Complete, Incomplete and Palliative.

1. *Complete operations* were performed on 160 cases; in this group are included all operations in which the whole breast, axillary contents, and sternal portion of the pectoralis major were removed; and the pectoralis minor either divided or removed. This statement of the requisites of a complete operation was accepted as the opinion of a majority of the surgeons at the hospital. Of the 160 complete operations, 16 per cent. were successful in preventing recurrence of the disease. In 26 of the 160 cases, the neck was dissected and lymphatic glands removed, but in only one case, in which the glands removed were found to be infected, was the operation a success in preventing recurrence.

The amount of skin removed with the breast has seemed to us a matter of great importance. In 67 of the complete operations, so much skin was taken that a plastic operation or skin-graft was necessary to close in the defect. The end results of these cases (19.4 per cent. free from recurrence) were better than of those in which the skin edges were readily drawn together (11.7 free from recurrence), but showed most conspicuously in the matter of recurrence in the scar; 57.6 per cent. of the plastic operations remained free from local recurrence in the scar, while only 44 per cent. of the sutured wounds were thus successful.

2. *Semi-complete operations* were performed in 75 instances. These were exactly similar to the complete operation, with the exception that the pectoralis minor was not disturbed; 25.3 per cent. remained free from recurrence.

3. *Incomplete Operations.*—Eighty-five cases, most of which were operated upon in the earlier years of this period, did not fulfill the conditions of the modern operation. In most of these the pectoralis major was not removed. In other cases part of the breast, or part of the axillary contents, were left behind. The results, however, were astonishing,—22 cases, or 25.9 per cent., remained free from recurrence.

These figures are, at first sight, a little disconcerting, but on consideration we have decided that the apparent paradox of more successful cases with the less extensive operations, is due to the selection of cases suitable for operation. Before the days of the complete operation, only the most favorable cases were considered suitable for an attempt at radical cure. As the complete operation developed, more and more advanced cases were submitted to operation, in the hope that they, too, might be saved. There are a number of surgeons in the hospital who perform a complete operation in practically every case, in order to give the patient the benefit of every possible chance of cure. Other surgeons reserve the more extensive operations for the earlier and more favorable cases. Lazarus, Barlow and Campiche, at the Middlesex Hospital, and Meissl, in the Vienna Clinic, have come in contact with the same

apparent paradox, and arrive at the same conclusion in explanation.

The advantage obtained by removal of the pectoralis minor appears to consist in the greater ease with which the upper axilla can be dissected. It is not apparent that this muscle is especially liable to infiltration.

4. *Palliative operations,* without hope of cure, were performed in only 56 (or about 15 per cent. of all the cases which came to operation). In all these cases cancerous tissue was supposed to have been left in the wound. Four cases, however, remained free from recurrence of the disease. It is possible that more of the disease was taken out in these cases than was supposed; it is not impossible, however, that a certain dosage of cancer may be recovered from spontaneously in human beings; just as undoubtedly occurs in the study of experimental cancer in mice. The operative mortality of 4 cases, or 7 per cent., is higher after palliative operations than after the most complete and extensive dissections (4 per cent.), but this is undoubtedly due to the enfeebled condition of patients with advanced cancer. At this point it may be reasonable to call attention to the fact that the cases we are reporting have not been selected in any way, but are given as they are recorded consecutively in the hospital records. Thus 85 per cent. of our cases have been subjected to an attempt at a radical cure, whereas the number of cases really entitled to expectation of benefit from a radical operation was probably much less. We would suggest that statistics of end results could be judged more fairly if the number of cases rejected as unfit for radical operation during the same period were also published.

Recurrences.—The data obtained from the study of recurrences form one of the most interesting features of cancer statistics.

There were 126 cases in which it is known that local recurrence appeared in the scar, and 138 in which it is known that none occurred. Thus 52 per cent. or over one-half of the cases were free of local recurrence, and would have been cured

if internal metastasis had not been already present, or did not, as seems possible in certain instances, result from the manipulation of the operation.

The date at which recurrence first appeared could be established with certainty in only a few of the cases in this series. The duration of life, however, gives some light upon this point,—41 of the total of 290 cases of recurrence lived over three years after operation, and 13 of these cases never showed at any time a recurrence in the scar. It is clear that the statement that a case survived three years after operation, without evidence of local recurrence, does not preclude the possibility of such a case dying later of internal metastasis.

Four authentic cases of "*late recurrence*" occurred in this series of cases. Two had local recurrence in the scar, which did not appear until eight years and eight years and five months, respectively, after operation. One was free from all sign of recurrence for seven years, and then developed metastasis in the spine, and another, well for six years and nine months, developed evidence of recurrence in the abdomen. Adding these 4 to the 13 of the preceding paragraph, we have 17 cases which did not show any sign of recurrence at three years, but died later with recurrence. To express this otherwise, 88 cases passed the three-year period without recurrence, but of these 17 (19 per cent.) later showed metastasis—exactly the percentage found by Schröder from a study of the cases at the Rostock Clinic.

SUMMARY.

I. Out of 416 cases of primary operations for cancer of the breast at the Massachusetts General Hospital from 1894, 1903 inclusive, 376 were traced to a conclusive end result at an average period of eight years after operation.

II. Sixty-four cases were alive and well and 7 died without recurrence over three years after the operation.

III. Counting in the operative mortality, there were 320 attempts at radical cure, 67 of which, or 20.9 per cent., were successful.

IV. During this same period palliative operations were performed on 56 patients (15 per cent.) and 52 cases were discharged untreated.

V. Cases in which the tumor was ulcerated, or was adherent to the skin or to the chest wall, and cases in which the axillary glands were palpably enlarged, gave notably less promising results than when these conditions did not exist.

VI. No case with palpably enlarged cancerous glands above the clavicle, and no case of cancer of both breasts, was cured.

VII. Medullary carcinoma was more grave than that of the scirrhus type, and adenocarcinoma and colloid were relatively of a far less malignant type.

VIII. The duration of the disease, other than in the individual case, exerted little influence on prognosis.

IX. Extensive operations with wide removal of skin gave the greatest freedom from local recurrence. Removal of the pectoralis minor appeared to be of slight significance. Incomplete operations on early cases yielded better results than extensive operations on cases which were well advanced.

X. Recurrence in the scar occurred in less than one-half of the cases. Internal metastasis was most frequent in the lungs, mediastinum, in the axillary and supraclavicular glands, the liver and the spine.

XI. Seventeen out of 88 cases or 19 per cent. of those passing the three-year limit without evidence of recurrence, showed recurrence later, and 4 cases developed recurrence six years or more after the operation.

FINAL RESULTS IN 164 CASES OF CARCINOMA OF THE BREAST OPERATED UPON DURING THE PAST FOURTEEN YEARS AT THE AUGUSTANA HOSPITAL.*

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In order to condense the study of these cases sufficiently to prevent this report from becoming altogether unwieldy it has seemed best to make the following tabulations, which were compiled by my associate, Dr. N. M. Percy, from the case histories of the hospital.

The present condition of 98 patients was determined partly by correspondence with patients and with their physicians, and partly by personal examinations.

From 63 cases no information has been obtained as yet, but only 20 letters have been returned unopened, consequently it is fair to suppose that further information can be obtained concerning the condition of some of the 63 cases not heard from.

Of the 98 cases concerning which we have received reports, 54 cases are still living, and all of these with two exceptions are at the present time free from recurrence.

One patient, case No. 38, had a carcinoma of both breasts, which were removed by primary operation in 1895 elsewhere. In 1897 she had a recurrence in the left axilla, which I operated on December 7, 1897. This side has remained well since. In 1899 she had a recurrence in the right axilla, which was removed elsewhere, and which has just developed a second recurrence.

A second case, No. 45, operated on September 19, 1898, for carcinoma of the breast, remained well until six months ago, when she noticed a swelling the size of a walnut, which has not been definitely diagnosed, although it is likely that it is a recurrence.

* Read before the American Surgical Association, May, 8, 1907.

I have not personally examined this patient since she left the hospital.

The following table gives the number of living cases from which we have definite reports:

Duration of time since operation	1 year	9 cases
	2 years	11 cases
	3 years	5 cases
	4 years	7 cases
	5 years	4 cases
	6 years	5 cases
	7 years	4 cases
	8 years	1 case
	9 years	3 cases
	10 years	1 case
	11 years	2 cases
	12 years	0 cases
	13 years	2 cases
Total		54 cases

Of the 54 cases heard from, ten complain of swelling or stiffness of the arm.

An interesting fact observed in our series of cases is shown by the following table of deaths.

It was found that but few of the very advanced cases which were considered quite hopeless at the time of operation lived more than one year after the operation, making the number that died directly after the operation from shock, together with those that lived less than one year, 25, or about 15 per cent.:

DEATHS.

Died of shock	5 cases
Died within 1 year	19 cases
Died within 2 years	6 cases
Died within 3 years	6 cases
Died within 4 years	1 case
Died within 5 years	2 cases
Died within 6 years	1 case
Died within 7 years	1 case
Died within 8 years	0 cases
Died within 9 years	0 cases
Died within 10 years	0 cases
Died within 11 years	1 case
Died within 12 years	0 cases
Died within 13 years	0 cases
Died within 14 years	1 case
Total	43 cases

ANALYTICAL TABLE OF CASES OF CARCINOMA OF BREAST OPERATED UPON AT THE AUGUSTANA HOSPITAL.

Number.	Hospital No.	Age.	Involvement of				Date of operation.	Operation.	Date of last communication of patient.	Result.
			Ax. Gl.	Cer. Gl.	Skin.	Muscle.				
1	265	45	×	....	....	....	April 26, 1887	Excision of breast and axillary glands	.....	Died 10 months later
2	350	49	....	....	....	....	Jan. 12, 1888	Excision of breast		
3	711	40	×	....	....	....	April 19, 1891	Excision of breast and axillary glands	None	
4	714	62	×	....	....	....	May 8, 1891	Excision of breast and axillary glands	None	
5	787	56	....	....	....	....	Oct. 4, 1891	Excision of breast	None	
6	799	44	....	....	....	....	Nov. 3, 1891	Excision of breast	None	
7	961	50	×	....	....	....	Sept. 18, 1892	Excision of breast and axillary glands	None	
8	1069	45	×	....	....	....	March 28, 1893	Excision of breast and axillary glands	.....	Recurrence in 3 months. Died 6 months later
9	1224	61	×	....	....	....	Oct. 24, 1893	Excision of breast and axillary glands	None	
10	1293	47	×	×	×	....	Jan. 2, 1894	Excision of breast, axillary, and cervical glands	.....	Died 6 weeks later of carcinoma of liver, pancreas, and kidneys
11	1319	39	....	....	....	....	Jan. 30, 1894	Excision of breast	None	
12	1373	44	....	....	....	....	March 12, 1894	Excision of breast	April 16, 1907	Had recurrence 1 year later. Doctor applied paste causing necrosis Perfectly well since
13	1673	36	×	....	×	×	Oct. 19, 1894	Excision of breast and axillary glands	.....	Had rapid recurrence
14	1850	31	×	....	....	....	Dec. 26, 1894	Excision of breast and axillary glands	April 24, 1907	No trouble since first illness
15	1970	82	....	....	....	....	Feb. 14, 1895	Excision of breast	None	
16	2133	63	....	....	....	....	June 2, 1895	Excision of breast	None	
17	2187	45	×	....	....	...	July 1, 1895	Excision of breast and axillary glands	None	

18	2351	47	....	....	....	....	Sept. 6, 1895	Excision of breast and axillary glands	April 15, 1905	No recurrence in 3 years, when she died of some other trouble
19	2621	44	....	....	....	....	Jan. 21, 1896	Excision of breast	None	
20	2750	66	×	....	....	....	Feb. 17, 1896	Excision of breast and axillary glands	None	
21	2702	39	....	....	....	....	Feb. 17, 1896	Excision of breast	None	
22	2705	42	×	....	×	....	Feb. 18, 1896	Excision of breast and axillary glands. Skin grafted	.....	Died 9 months after operation apparently from involvement of internal organs
23	2863	52	×	×	×	×	May 9, 1896	Excised axillary and cervical glands. Excision of breast and pectoral muscles	.....	Never seemed to gain much strength and died about 4 months after operation
24	3001	38	....	....	....	....	June 24, 1896	Excision of breast	None	
25	3110	46	....	....	....	....	Aug. 10, 1896	Excision of breast	None	
26	3292	57	×	....	....	....	Oct. 13, 1896	Excision of breast and axillary glands	April 16, 1907	No recurrence. Died of apoplexy, April 12, 1907
27	3328	37	....	....	....	....	Oct. 29, 1896	Excision of breast	April 16, 1907	Perfectly well since
28	3367	37	×	....	....	....	Nov. 16, 1896	Excision of breast and axillary glands	None	
29	3373	56	×	×	×	×	....	Inoperable. Applied calcium carbide		No relief
30	3548	60	....	....	....	....	Feb. 5, 1897	Excision of breast	None	
31	3705	50	....	....	....	....	March 31, 1897	Excision of breast	None	
32	3745	59	....	....	....	....	April 18, 1897	Excision of breast	April 17, 1907	No recurrence in 5 years, when she died of nephritis
33	3799	25	×	....	....	....	May 11, 1897	Excision of breast and axillary glands	None	
34	3945	46	×	....	....	....	July 5, 1897	Excision of breast and axillary glands	None	
35	4034	63	×	....	....	....	July 31, 1897	Excision of breast and axillary glands	None	
36	4095	36	×	....	....	....	Aug. 24, 1897	Excision of breast and axillary glands	None	
37	4395	57	×	....	....	....	Dec. 1, 1897	Excision of breast and axillary glands	April 22, 1907	No recurrence. Fairly good health
38	4410	29	×	....	×	×	Dec. 7, 1897	Recurring case. Excision of pectoral and major and minor muscles and axillary glands	April 21, 1907	Both breasts removed. Primary operation 1895. Recurred left axilla 1897. Recurred right axilla 2 years later, which was removed 18 months ago. Now has another recurrence in right axilla

ANALYTICAL TABLE OF CASES OF CARCINOMA OF BREAST OPERATED UPON AT THE AUGUSTANA HOSPITAL.—*Continued.*

Number.	Hospital No.	Age.	Involvement of				Date of operation.	Operation.	Date of last communication of patient.	Result.
			Ax. Gl.	Cer. Gl.	Skin.	Muscle.				
39	4783	48	×	....	....	....	March 29, 1898	Excision of breast and both pectoral muscles and axillary glands	None	
40	4909	39	....	....	....	....	May 3, 1898	Excision of breast	None	
41	5055	38	×	....	....	....	May 22, 1898	Excision of breast and axillary glands	April 19, 1907	No recurrence. Never felt better than she does now
42	5156	58	×	....	....	....	July 12, 1898	Excision of breast and axillary glands	April 15, 1907	No recurrence in 7 years, when she died of some other trouble
43	5281	48	×	....	....	....	Aug. 21, 1898	Excision of breast and axillary glands	None	
44	5362	44	×	....	....	....	Sept. 11, 1898	Excision of breast and axillary glands	Examined April 8, 1907	No signs of recurrence. General health good
45	5397	45	×	....	....	....	Sept. 19, 1898	Excision of breast and axillary glands	April 18, 1907	Felt poorly for 4 years after operation. Since then very well. Some stiffness of arm from shoulder to elbow. 6 months ago noticed swelling size of walnut. Did not state location
46	5416	55	×	....	....	....	Sept. 27, 1898	Excision of breast and axillary glands	.....	Died of cancer two years after operation
47	5460	50	×	....	....	....	Oct. 5, 1898	Excision of breast and axillary glands	None	
48	5484	50	×	....	....	....	Oct. 15, 1898	Excision of breast and axillary glands	None	
49	5525	53	×	....	....	....	Oct. 27, 1898	Excision of breast and axillary glands and pectoral muscles	None	
50	5541	34	×	....	....	....	Nov. 1, 1898	Excision of breast and axillary glands and pectoral muscles	None	
51	5637	44	×	....	....	....	Dec. 6, 1898	Excision of breast and axillary glands and pectoral muscles	None	
52	5684	42	....	....	....	....	Dec. 27, 1898	Excision of breast	None	
53	5822	41	×	×	×	....	Feb. 4, 1898	Excision of breast and pectoral muscles and axil. and cer. glands.	.....	Died of shock on 4th day

54	5830	25	....	....	....	....	Feb. 5, 1898	Excision of breast	None	
55	5887	62	....	....	....	....	Feb. 19, 1898	Excision of breast and pectoral muscles and axillary glands	.....	Had recurrence in scar 18 months later
56	6113	26	×	....	....	....	April 23, 1899	Excision of breast and pectoral muscles and axillary glands	None	
57	6171	28	×	....	....	....	May 10, 1899	Excision of breast and pectoral muscles and axillary glands. Skin graft	.....	Had rapid recurrence and died about 4 months after operation
58	6253	38	×	....	....	....	May 30, 1899	Excision of breast and pectoral muscles and axillary glands	None	
59	6552	42	×	....	....	....	Aug. 17, 1899	Excision of breast	None	
60	6631	50	×	....	....	....	Sept. 17, 1899	Excision of breast and pectoral muscles and axillary glands		
61	6773	48	×	....	....	....	Oct. 9, 1899	Excision of breast and pectoral muscles and axillary glands	None	
62	6905	35	×	....	....	....	Nov. 12, 1899	Excision of breast and pectoral muscles and axillary glands	None	
63	6968	46	....	....	....	....	Dec. 3, 1899	Excision of breast and pectoral muscles and axillary glands	April 15, 1907	Perfectly well. Can use arm nearly as well as other side
64	7071	64	....	....	....	....	Jan. 4, 1900	Excision of breast and pectoral muscles and axillary glands	April 26, 1907	Operation successful. Never troubled since
65	7109	55	×	....	....	....	Jan. 16, 1900	Excision of breast and pectoral muscles and axillary glands	None	
66	7211	44	×	....	....	....	Feb. 7, 1900	Excision of breast and pectoral muscles and axillary glands	April 18, 1907	No recurrence. Considerable swelling and disability of arm for 3 years, but since then no trouble
67	7350	34	×	....	....	....	March 12, 1900	Excision of breast and pectoral muscles and axillary glands	None	
68	7394	67	....	....	....	....	March 21, 1900	Excision of small nodule from old scar, size of pea	None	Recurrent case. Had breast excised 6 months previously. Skin recurrence in line of incision
69	7427	39	....	....	....	....	March 27, 1900	Excision of breast and pectoral muscles and axillary glands	.....	Died of recurrence 3 years later

ANALYTICAL TABLE OF CASES OF CARCINOMA OF BREAST OPERATED UPON AT THE AUGUSTANA HOSPITAL.—*Continued*

Number.	Hospital No.	Age.	Involvement of				Date of operation.	Operation.	Date of last communication of patient.	Result.
			Ax. Gl.	Cer. Gl.	Skin.	Muscle.				
70	7528	31	×	....	....	....	April 24, 1900	Excision of breast and pectoral muscles and axillary glands	None	
71	7530	77	×	....	....	×	April 24, 1900	Excision of breast and pectoral muscles and axillary glands	.....	Died of shock on 4th day
72	7554	37	×	....	×	....	April 29, 1900	Excision of breast and pectoral muscles and axillary glands	.....	Had rapid recurrence and died about 6 months after operation
73	7717	40	×	....	....	×	June 5, 1900	Excision of breast and pectoral muscles and axillary glands	None	
74	7749	48	×	×	×	....	June 12, 1900	Excision of breast and pectoral muscles and axillary glands	None	Died of shock next day
75	7968	66	×	....	....	....	August 9, 1900	Excision of breast and pectoral muscles and axillary glands	.....	Died of shock same night
76	8083	44	×	....	....	....	Sept. 8, 1900	Excision of breast and pectoral muscles and axillary glands	April 15, 1907	Arm in good health. Has not been bothered again
77	8103	61	×	....	....	....	Sept. 11, 1900	Excision of breast and pectoral muscles and axillary glands	None	
78	8123	38	×	....	×	....	Sept. 16, 1900	Excision of large area skin. Skin grafting	.....	Recurrent case
79	8141	65	....	....	×	....	Sept. 20, 1900	Excision of nodule in scar	.....	Primary operation 18 months previous. Recurrent nodule in scar. Lived 3 years after this; 4½ years after previous operation
80	8154	50	....	....	....	....	Sept. 23, 1900	Excision of breast and pectoral muscles and axillary glands	None	
81	8350	37	×	....	....	....	Jan. 1, 1900	Excision of breast and pectoral muscles and axillary glands	April 16, 1907	No recurrence to present time; operation successful. No X-ray

82	8575	35	×	....	....	....	Jan. 9, 1901	Excision of breast and pectoral muscles and axillary glands	April 19, 1907	No return of disease. Perfectly well since operation
83	8648	57	×	....	....	....	Jan. 23, 1901	Excision of breast and pectoral muscles and axillary glands	April 20, 1907	Perfectly well since operation. Very useful arm
84	8742	43	×	....	....	....	Feb. 5, 1901	Excision of breast and pectoral muscles and axillary glands	April 18, 1907	Examined personally. No signs of recurrence. No œdema of arm
85	8838	39	....	....	....	....	March 6, 1901	Excision of breast and pectoral muscles and axillary glands	None	
86	9038	46	×	....	....	....	April 18, 1901	Excision of breast and pectoral muscles and axillary glands	April 16, 1907	No return of disease. Has experienced considerable discomfort with arm. But nothing serious
87	9147	29	....	....	....	....	May 17, 1901	Excision of breast and pectoral muscles and axillary glands	1 year ago perfectly well	Two years later recurrence in line of incision, axilla, and cervical region. All disappeared under X-ray treatment
88	9222	56	×	...	....	....	June 3, 1901	Excision of breast and pectoral muscles and axillary glands	.....	Had recurrence in axillary glands of opposite side in 3 months. Died 6 months later
89	9331	76	×	....	×	....	June 26, 1901	Excision of breast and pectoral muscles and axillary glands	None	
90	9538	31	×	....	....	....	Aug. 13, 1901	Excision of breast and pectoral muscles and axillary glands	None	
91	9542	38	×	....	....	....	Aug. 31, 1901	Excision of breast and pectoral muscles and axillary glands	None	
92	9753	34	×	....	....	....	Oct. 2, 1901	Excision of breast and pectoral muscles and axillary glands	.....	Died a few months later, apparently from some internal recurrence
93	9793	67	×	....	....	....	Oct. 5, 1901	Excision of breast and pectoral muscles and axillary glands	.....	Died May, 1905. Had X-ray treatment for 3 years
94	9800	42	×	....	×	....	Oct. 7, 1901	Excision of breast and pectoral muscles and axillary glands	.....	Died of recurrence, April 1, 1903. Took X-ray for 1 year
95	9841	70	×	....	×	....	Oct. 19, 1901	Excision of breast and pectoral muscles and axillary glands	None	
96	9904	60	×	....	×	....	Oct. 31, 1901	Excision of breast and pectoral muscles and axillary glands	.....	Recurred 1 year after operation. Recurrence disappeared under X-ray. Recurred 2 years later. Died 3 years after operation
97	9952	41	×	....	....	....	Nov. 15, 1901	Excision of breast and pectoral muscles and axillary glands	1 year ago	Well at that time.

ANALYTICAL TABLE OF CASES OF CARCINOMA OF BREAST OPERATED UPON AT THE AUGUSTANA HOSPITAL.—*Continued*

Number.	Hospital No.	Age.	Involvement of				Date of operation.	Operation.	Date of last communication of patient.	Result.
			Ax. Gl.	Cer. Gl.	Skin.	Muscle.				
98	10167	60	×	....	×	....	Jan. 10, 1902	Excision of breast and pectoral muscles and axillary glands. Skin graft	.....	Had rapid recurrence and died 4 months later
99	9985	32	×	....	....	....	Nov. 18, 1902	Excision of breast and pectoral muscles and axillary glands	.....	Died of recurrence 2 years later. Had many X-ray treatments
100	10390	48	×	....	×	....	Feb. 28, 1902	Excision of breast and pectoral muscles and axillary glands	April 12, 1907	Perfectly well. Took X-ray treatment for 1 year
101	10441	67	×	....	....	....	March 10, 1902	Excision of breast and pectoral muscles and axillary glands	None	
102	10656	67	×	×	×	....	June 23, 1902	Inoperable. No improvement		
103	10933	66	×	×	×	....	June 23, 1902	Excised recurrent mass in skin and axillary and cervical glands	.....	Primary operation 6 years previous. Not heard from since second operation
104	11064	52	×	....	....	....	July 21, 1902	Excised breast and pectoral muscles and axillary glands	.....	Had other breast excised for carcinoma 2 years previous. X-ray for 1 year after first operation
105	11437	64	....	....	....	....	Sept. 29, 1902	Excised breast and pectoral muscles and axillary glands	.....	Died of recurrence in May, 1903
106	11658	54	×	....	....	....	Nov. 22, 1902	Excised both breasts for carcinoma	.....	Died of cancer of stomach 1 year later
107	11790	41	....	....	....	....	Dec. 8, 1902	Excised breast and pectoral muscles and axillary glands	April 15, 1907	Took 60 X-ray treatments after operation. No recurrence. Great deal of pain in shoulder
108	12015	33	×	....	....	....	Jan. 21, 1903	Excised breast and pectoral muscles and axillary glands	.....	18 months after operation had recurrence in ilium, from which she died. Had X-ray for 1 year following operation
109	12098	57	×	....	....	....	Feb. 6, 1903	Excised breast and pectoral muscles and axillary glands	April 13, 1907	No recurrence. Great deal of œdema of arm. X-ray for 1 year

110	12130	44	×	....	×	×	Feb. 13, 1903	Excised breast and pectoral muscles and axillary glands		
111	12141	41	×	....	....	....	Feb. 15, 1903	Excised breast and pectoral muscles and axillary glands	Feb. 26, 1907	No recurrence. Great deal of œdema in arm
112	12384	52	×	×	....	....	April 1, 1903	Excised breast and pectoral muscles and axillary glands	....	Died of recurrence a few months after operation
113	12423	56	×	....	×	....	April 10, 1903	Excised breast and pectoral muscles and axillary glands	Nov., 1906	No signs of recurrence. Considerable œdema of arm
114	12424	47	×	....	....	....	April 10, 1903	Excised breast and pectoral muscles and axillary glands	.....	
115	12469	75	×	....	....	....	April 17, 1903	Excised breast and pectoral muscle and axillary glands	.....	Died 1 year after operation. No local signs of recurrence
116	12740	54	×	....	....	....	June 8, 1903	Excised breast and pectoral muscles and axillary glands	.....	Died 3 years later from pneumonia. No signs of recurrence
117	12866	64	....	....	....	....	June 30, 1903	Excised breast and pectoral muscles and axillary glands	None	
118	12982	58	×	....	....	....	July 24, 1903	Excised breast and pectoral muscles and axillary glands	None	
119	13017	57	×	....	....	....	July 30, 1903	Excised breast and pectoral muscles and axillary glands	.....	Died of cancer in chest 6 months later
120	13019	43	×	....	....	....	July 31, 1903	Excised breast and pectoral muscles and axillary glands	April 11, 1907	Perfectly well since operation
121	13154	40	×	....	....	....	August 26, 1903	Excised breast and pectoral muscles and axillary glands	May 1, 1907	Perfectly well. Had few X-ray treatments
122	13396	47	×	....	....	....	Oct. 9, 1903	Excised breast and pectoral muscles and axillary glands	April 12, 1907	X-ray for 3 months. One year later carcinoma developed in other breast. This was removed. Well now
123	13415	45	×	....	....	....	Oct. 12, 1903	Excised breast and pectoral muscles and axillary glands	April 13, 1907	30 X-ray treatments after operation. Slight swelling of arm. Otherwise well
124	13423	30	....	....	×	....	Oct. 12, 1903	Excision of breast and fascia of pectoral muscle and axillary glands	None	
125	13905	50	....	....	×	....	Jan. 24, 1904	Excised small nodule from old scar	April 22, 1907	Recurrent case. Primary operation Jan. 30, 1903. Had several slight recurrences after second operation, which were cauterized with arsenic. Healed after this

ANALYTICAL TABLE OF CASES OF CARCINOMA OF BREAST OPERATED UPON AT THE AUGUSTAN HOSPITAL.—*Continued*

Number.	Hospital No.	Age.	Involvement of				Date of operation.	Operation.	Date of last communication of patient.	Result.
			Ax. Gl.	Cer. Gl.	Skin.	Muscle.				
126	13990	44	×	....	....	....	Feb. 15, 1904	Excised breast and pectoral muscles and axillary glands	.....	Died 18 months after operation of carcinoma
127	14733	39	....	....	....	....	July 18, 1904	Excised breast and pectoral muscles and axillary glands	April 11, 1907	X-ray for 3 months after operation. Perfectly well now
128	14971	62	×	....	×	×	August 31, 1904	Excised breast and pectoral muscles and axillary glands	None	
129	15004	43	×	....	×	×	Sept. 2, 1904	Excised breast and pectoral muscles and axillary glands	Jan., 1907	Recurrent case. Had portion of breast removed 3 months previous. Again had recurrence. X-ray and serum treatment. Well at present
130	15229	95	...	...	....	....	Oct. 22, 1904	Excised breast and pectoral muscles and axillary glands	April 12, 1907	Perfectly well
131	15388	39	×	....	....	....	Nov, 26, 1904	Excised breast and pectoral muscles and axillary glands	None	
132	15398	35	×	×	×	....	Nov. 30, 1904	Excised breast and pectoral muscles and axillary glands	.....	Had rapid recurrence and died April 25, 1905
133	15440	60	×	....	×	....	Dec. 7, 1904	Excised breast and pectoral muscles and axillary glands	April 10, 1907	No return of disease. General health very good
134	15533	70	....	....	....	....	Jan. 4, 1905	Excised breast and pectoral muscles and axillary glands	April 12, 1907	Examined personally. No sign of recurrence
135	15774	45	×	....	×	....	Feb. 22, 1905	Excised breast and pectoral muscle and axillary glands. Skin grafted	.....	Died Oct. 16, 1905, apparently from carcinoma inside of chest
136	15782	51	×	....	....	....	Feb. 24, 1905	Excised breast and pectoral muscles and axillary glands	May 4, 1907	Perfectly well

137	15080	45	×	....	....	....	March 1, 1905	Excised breast and pectoral muscles and axillary glands	April 18, 1907	Took long time to regain strength. Perfectly well now
138	16182	35	....	....	....	....	May 1, 1905	Excised breast and pectoral muscles and axillary glands	None	
139	16253	72	....	....	....	....	May 24, 1905	Excised breast and pectoral muscles and axillary glands	April 14, 1907	About 3 months after operation a small nodule appeared above clavicle. Has remained same ever since. No pain
140	16346	40	×	....	×	....	June 5, 1905	Excised breast and pectoral muscles and axillary glands	April 15, 1907	Has taken 27 X-ray treatments. No recurrence.
141	16351	46	....	....	....	....	June 5, 1905	Excised breast and pectoral muscles and axillary glands	None	
142	16464	55	....	....	....	....	Juue 23, 1905	Excised breast and axillary gland, left pectoral muscles	April 14, 1907	No recurrence. General health has not been so good in years
143	16813	45	×	....	....	....	August 23, 1905	Excised breast and pectoral muscles and axillary glands	April 12, 1907	No signs of recurrence
144	16824	39	×	....	×	....	August 25, 1905	Excised breast and pectoral muscles and axillary glands	.....	Died 8 months later from carcinoma in chest
145	17212	44	×	....	....	....	Oct. 23, 1905	Excised breast and pectoral muscles and axillary glands	April 15, 1907	Perfectly well, except some swelling of arm
146	17247	57	×	....	....	....	Oct. 27, 1905	Excised breast and pectoral muscle and axillary glands	None	
147	17401	45	×	....	....	....	Nov. 22, 1905	Excised breast and pectoral muscles and axillary glands	April 21, 1907	Perfectly well except at times has stiffness in arm
148	17515	54	×	....	×	×	Dec. 11, 1905	Excised breast and pectoral muscles and axillary glands	.....	Had rapid recurrence, and died July 22, 1906
149	17556	44	×	....	....	....	Dec. 18, 1905	Excised breast and pectoral muscles and axillary glands	April 18, 1907	Some numbness in arm. Otherwise well
150	17558	38	....	....	×	....	Dec. 20, 1905	Excised breast and pectoral muscles and axillary glands	.....	Died about 10 months later of carcinoma
151	17606	50	....	....	....	....	Dec. 26, 1905	Amputation of arm and scapula and part of clavicle	.....	Recurrent case. Primary operation June, 1905. Died of shock
152	17656	57	×	....	×	....	Jan. 3, 1905	Excised breast and pectoral muscles and axillary glands	Examined April 12, 1907	There was evidence of local recurrence. This removed by actual cautery. Wound not completely healed. Still takes X-ray

ANALYTICAL TABLE OF CASES OF CARCINOMA OF BREAST OPERATED UPON AT THE AUGUSTANA HOSPITAL.—*Continued*

Number.	Hospital No.	Age.	Involvement of				Date of operation.	Operation.	Date of last communication of patient.	Result.
			Ax. Gl.	Cer. Gl.	Skin.	Muscle.				
153	17883	73	×	....	....	....	Feb. 2, 1906	Excised breast and dissected axilla	Examined April 3, 1907	Perfect result. No signs of recurrence
154	17907	48	×	...	....	....	Feb. 7, 1906	Excised breast and pectoral muscles and axillary glands		
155	18694	52	×	....	....	....	June 11, 1906	Excised breast and pectoral muscles and axillary glands	April 22, 1907	No signs of recurrence. Has pain in arm if she uses it too much
156	18752	39	×	....	....	....	June 18, 1906	Excised breast and pectoral muscles and axillary glands	April 28, 1907	No return of former disease. X-ray 3 times a week for 5 weeks
157	18979	55	×	....	....	....	July 23, 1906	Excised breast and pectoral muscles and axillary glands	March 4, 1907	No recurrence. Some contraction of scar in axilla
158	18981	56	....	....	....	....	July 23, 1906	Excised breast and pectoral muscles and axillary glands	April 30, 1907	Perfectly well. Has had 24 X-ray treatments
159	19033	49	×	....	....	....	August 1, 1906	Excised breast and pectoral muscles and axillary glands	April 18, 1907	No signs of recurrence. Arm somewhat stiff
160	19258	47	×	....	....	....	Sept. 3, 1906	Excised breast and pectoral muscles and axillary glands	April 15, 1907	Perfect result X-ray treatment for 4 months
161	19636	64	....	....	....	....	Oct. 26, 1906	Excised breast and pectoral muscles and axillary glands	April 13, 1907	Took X-ray treatment for 5 weeks. Feels perfectly well
162	19799	65	×	....	×	×	Nov. 28, 1906	Excised breast and pectoral muscles and axillary glands and cauterized over ribs	... .	Died Feb. 2, 1907, from extension of carcinoma into chest
163	19904	54	×	....	×	×	Dec. 10, 1906	Excised mass in old scar and cauterized base of wound with actual cautery	.....	First operation Feb., 1900. Rapid recurrence. Second operation Oct. 19, 1900. In 1901 another recurrence, which disappeared under X-ray treatment. Present recurrence began 1 year ago
164	.....	48?	....	....	....	....	May 23, 1889	Excised breast	.....	Had recurrence 10 years later, which was excised May 23, 1899. Had recurrence 1 year later. Took X-ray treatments until Oct., 1903, when she became bed-fast and died a short time afterwards

Cases not heard from, 63.

Of the 44 patients whose deaths have been reported, only 39 died either as a result of the operation or from recurrence.

The following five cases died of other causes than carcinoma without recurrence:

CASE 18.—Age 47, died three years after operation from some acute disease not stated in the letter reporting her death. No signs of recurrence.

CASE 26.—Age 57, died ten years and six months after operation from apoplexy. No signs of recurrence.

CASE 32.—Age 59, died five years after operation from nephritis. No signs of recurrence.

CASE 42.—Age 58, died seven years after operation. No signs of recurrence.

CASE 116.—Age 54, died three years after operation from pneumonia. No signs of recurrence.

The following case seems to have especial interest:

CASE 12.—Age 44, was operated upon March 12, 1894. One year later had recurrence in scar. Doctor applied a paste causing necrosis of the wound. This healed completely, and patient has been perfectly well since. Now thirteen years and two months since operation.

It has seemed proper to use X-ray treatment systematically in all cases after operation. This, however, was not always possible in patients living in the smaller country towns.

Cases which had X-ray Treatments.—All cases operated during the past six years had X-ray exposures during the patient's stay in the hospital. Of the cases heard from, 22 took X-ray treatment after leaving the hospital.

The following cases seem to be sufficiently interesting to justify especial abstracts of their histories:

CASE 87.—Age 29. Operated May 17, 1901. Six months later she had a recurrence in the line of the incision, with numerous nodules in the skin, a recurrence in the axillary and cervical glands, and apparently a carcinoma in the cranial cavity causing a marked protrusion of the right eye. All of these disappeared

under X-ray exposures. The patient was last heard from one year ago. She was perfectly well at this time, five years after the operation.

CASE 96.—Age 60. Had recurrence one year after operation. This disappeared under X-ray exposures, but recurred two years later, from which she died.

CASE 125.—Age 50. Operated upon January 24, 1904. Following this had recurrence in scar. Was given vigorous X-ray exposures with very little benefit. Arsenic was applied to wound, causing necrosis of considerable amount of tissue. Wound healed completely. Patient perfectly well now.

CASE 129.—Age 43. Operated upon September 9, 1904. Had primary operation three months previous, when only a portion of the breast was removed. Had second recurrence a few months later. Under X-ray exposures and the treatment by hypodermic injections of a proprietary remedy recurrence disappeared and she is now perfectly well.

CASE 163.—Age 54. Primary operation February, 1900. Rapid recurrence. Second operation October, 1900. A few months later a second recurrence, involving the axilla and the cervical lymph glands and the tissues of the scar, making further operative treatment apparently hopeless. This disappeared under X-ray treatment and remained well for four years. Third recurrence began one year ago. This was excised December 10, 1906. Has had X-ray treatment most of the time during the past five years. Examined May 20, 1907, and found well.

CASE 164.—Age 48. Operated upon May 23, 1889. Had recurrence ten years later, which was excised May 23, 1899. Recurred one year later. Took X-ray treatments continually for three and one-half years, when she died of carcinoma.

A review of this series of cases, although incomplete, seems to show that if the very complete operation which is now generally practised is employed in these cases reasonably early, there is much reason for expecting a fair percentage of permanent cures.

END RESULTS FOLLOWING OPERATIONS FOR CARCINOMA OF THE BREAST.*

BY NATHAN JACOBSON, M.D.,

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In discussing the results to be obtained from operation upon carcinoma of the breast there are various factors to be carefully weighed. Considering these in their natural order we should first be concerned with the period of duration of the disease and the rapidity of its progress, next with the extent of involvement of the various structures and the character of the carcinoma and finally with the radical nature of the operation performed for its removal.

It is not always possible to determine the period of duration of the disease. Inasmuch as in its early stages carcinoma is entirely devoid of pain, it is frequently a matter of accident that the tumor is discovered. In one of my cases the patient dreamed that she had a tumor of the breast and the next morning on awakening was startled to find on placing her hand upon the gland that a tumor was present.

The rapidity with which the disease progresses is of paramount importance. I think that it will be conceded without dispute that there is as much difference in the virulence of cases of carcinoma as there is in acute infectious fevers. In some instances of the latter, the fever will progress so mildly as to scarcely disturb the patient, while in other instances it will overwhelm the individual with such fury as to be fatal within twenty-four hours. Acute cases can be of scirrhous as well as medullary character.

October 9, 1901, a woman forty-one years of age, the mother of two children both of whom she had nursed and never having

* Read at the meeting of the American Surgical Association May 8, 1907.

had any disturbance of the breasts because of lactation, presented herself for examination. Ten days before she had discovered a hardness in the right mammary gland. I found a tumor the size of a hen's egg in the right breast, occupying the outer upper quadrant; freely moveable and non-adherent. In the axilla there were many glandular masses which were hard and somewhat fixed to the skin. It did not seem possible that this condition could have been of but ten days' duration. At the operation not only the skin covering the mammary gland but that of the axilla was freely removed as well as the axillary contents and both pectoral muscles. The axillary mass was found to be larger than the primary growth. She made a rather slow recovery inasmuch as it was impossible to cover the entire surface at the operation and some of the healing therefore was by granulation. A recurrence in the axilla was discovered January 17, 1902. This was removed five days later by operation. Union this time was by first intention. February 7, 1902, that is a little more than two weeks after her second operation, she began to suffer from pains in the abdomen, chest and back. Early in March twitching occurred in both lower extremities. On March 11 there was complete paralysis of sensation and motion below the level of the seventh dorsal vertebra. The patient died April 23, 1902, within six months of the first evidence of the disease. Microscopic examination of the tumor showed it to be a scirrhous carcinoma.

Another equally virulent scirrhous cancer occurred in a woman fifty-two years of age, operated upon November 18, 1899. She had known of the presence of the growth but two days and yet upon examination the entire gland was found to be implicated, the skin adherent, the nipple retracted, and the corresponding axillary glands palpable. A very wide excision of all of the diseased area including the skin, mammary gland, pectoral muscles and the axillary contents was performed. The patient made a rapid recovery, the wound healing by first intention. She left the hospital on the sixteenth day after operation in good general condition. Three months later there was not only recurrence in the scar at the junction of the middle and lower third but over the entire chest and on the back small shot-like nodules were to be felt as well as nodes in the supraclavicular spaces. Similar nodules appeared in various parts of the body, rapidly increased

in size as well as number; the cachexia grew profound and the patient succumbed to the disease in August, 1900.

In this class of cases it matters little what operation is selected or how early it may be performed, the evident virulence of the infection renders a permanent cure impossible. As far as I am aware there is nothing which either the surgeon or the pathologist can discover at the time of operation which will make it possible for him to determine the degree of malignancy of the affection aside from the rapid course the disease has pursued up to the time of operation.

There is another class of cases which show their tenacity and the patient's susceptibility to carcinoma by repeated outbreaks in different parts of the body.

On June 19, 1895, I curetted the uterus of a woman forty years of age, and found carcinomatous disease of the fundus. Not until the next spring did she consent to hysterectomy. In May, 1898, she discovered a tumor in the depth of her right breast. Amputation of the gland was not permitted until September 18, 1898. The tumor, about 1½ inches in diameter, did not involve the skin and was quite moveable. There were numerous glands to be felt in the axilla and after removal of the breast the pectoral muscles, sub-pectoral and axillary glands the patient apparently made a very good recovery. Glandular metastases discovered in the posterior triangle of her neck on the right side and in the axilla in January, 1900, were again removed. On June 7, 1900, there was a recurrent nodule in the scar tissue on the chest and this was cut out. She remained well until January, 1902, when there was another recurrence in the cicatrix and involvement of the supraclavicular glands of the opposite side of the neck. In removing them I followed the chain down until I found it to be continuous with the glands in the mediastinum. From this time on she suffered greatly from dyspnœa, laryngeal stridor and a racking cough. There was implication of the left recurrent laryngeal nerve. In December, 1902, orthopnea was marked. She died January 9, 1903, fully eight years after the first evidence of carcinomatous disease.

On March 10, 1897, I performed hysterectomy for carcinoma

of the uterus on a woman thirty-nine years of age, from which she made a very satisfactory recovery. September 23, 1899, she presented herself to me with a hard tumor in the lower outer quadrant of the left breast associated with enlarged axillary glands. The entire breast with its overlying skin, the axillary glands and the pectoralis major were removed. She had no recurrence of the carcinomatous disease either in the breast or pelvis but developed cancer of the stomach from which she died January 2, 1901.

In still another case I amputated the right breast in March, 1891, and without evidence of any local recurrence she returned to me in June, 1892, with a similar disease of the left breast. This was likewise amputated. In January, 1895, a spinal metastasis occurred and the patient gradually became paralyzed in both upper and lower extremities and died of the spinal recurrence December 21, 1895.

This group of cases in which carcinoma manifests itself in different organs of the body and in which the new outbreak of the disease occurs without return at the primary site indicates that in a certain class of cases we cannot lose sight of the personal equation, as evidently some individuals possess a pronounced susceptibility to cancerous disease.

That advanced age is not a matter of great import in determining the prognosis is evident in the following two cases:

The first was a woman eighty years of age, who had known of the presence of the tumor for two weeks. Radical operation was performed on June 30, 1904. The axillary space was thoroughly cleared out, the pectoralis major was removed, and in just two weeks' time she left the hospital, primary union having followed operation. She died one year later of conditions incident to her vascular condition and without recurrence of the cancer. The pathologist's report in this case was scirrhus carcinoma.

In the second case I operated upon a woman seventy-eight years of age who had been aware of the presence of the tumor but ten days. Here also there was well advanced atheromatous degeneration. She did not die until five years after operation, when her death was caused by apoplexy. At the time of operation

the patient was already suffering from cerebral changes incident to the vascular disease. She complained of tingling and numbness of her extremities and suffered from dizziness and aphasia. Ten months after operation there was a slight recurrence in the scar. This was treated by the application of a caustic paste which removed the diseased part. In the course of six weeks it had entirely healed. The patient had no subsequent recurrence.

This is the only instance in which I did not use the knife for the removal of the recurrent growth.

On the contrary, I embodied in a paper read before the Medical Society of the State of New York at its annual meeting in 1896 some statistics obtained from a gentleman whose wife was treated at a so-called cancer cure institution by means of caustic applications. Among those receiving the same treatment in this institution were fifteen patients with carcinoma of the breast. The end result of the treatment was obtained in each case. In no instance was there any benefit, but each and every one died of the cancerous affliction after months of torture.

I had occasion to operate upon a religious sister in May, 1890, for carcinoma of the breast of one year's duration during which period she had been treated by a self-styled cancer specialist with caustic plasters, only to produce a sloughing condition of the breast. A prompt recovery followed removal of the breast, the axillary contents and part of the pectoralis major. A letter received from her physician, Dr. Hancock of Jeffersonville, Indiana, April 22, 1907, *i.e.*, seventeen years later, reports her to be in good health with no recurrence of cancer.

There can be no doubt that the removal of recurrent growths may be followed by lasting cures.

A patient was operated upon by me August 24, 1896, for scirrhus of the right breast of some months' existence. There were marked glandular metastases in the axilla. Local recurrence in the scar tissue and neighboring glands appeared twenty-one months later. The recurrent growths were removed by

operation May 18, 1898, and since then the patient has had no return, has enjoyed perfect health, and has the full use of her arm.

Whether sex is a factor to be considered in the ultimate prognosis of malignant diseases of the breast I am unable to say. I have had but 3 cases of malignant tumor of the male breast, each of them recurring and in the end causing death.

I have been greatly disappointed in my efforts to obtain information in regard to many of the patients upon whom I have operated. Of 71 cases reported upon and which were operated more than three years ago, 35 are still living; 33 died of metastases and 3 within a year after operation of other diseases.

As has been stated, some of the most acute recurrences have been in cases of the scirrhous type.

In our pathologic studies some attention has been given to the investigations of the presence of mitotic figures to determine whether evidence of active cell division implied the probability of early recurrence. This has not been found to be the case. For example, in one specimen of scirrhus mitotic figures were found to be rare in the breast tumor, but numerous in the lymph nodes. There was evidence of spinal metastases eight months after operation, death occurring two months later. In another scirrhus carcinoma of a breast removed May 27, 1903, mitotic figures were very abundant, but the patient is at present in the full enjoyment of health, having never had the slightest recurrence.

During the past ten years I have employed the incision suggested by Dr. Halsted and have followed his technique except as to the removal of the supraclavicular glands in ali cases. The latter step has only been undertaken when there has been apparent invasion of the neck. The axillary space has been thoroughly cleaned out, the pectoralis major and sometimes the pectoralis minor have been removed. After making the skin incision, the axillary space is first cleared and an attempt made to remove everything en masse. The great advantage of being able to see the field of operation clearly

at every step of the operation cannot be too highly appreciated.

For the past two years, when it has been possible to do so, the patients have been given weekly X-ray treatments for at least three months after their recovery from the operation.

During the decade preceding the last ten years I was guided by the principles enunciated by the late Samuel W. Gross in the paper presented to this association at its meeting in 1881. A circular incision was made around the breast and extended into the axilla. The axillary fat with the glands buried in its substance was removed, together with the upper layer of the pectoralis major. In cleaning the axilla by this method one had to depend largely upon the sense of touch, and hence there was always a degree of uncertainty as to whether all invaded structures were thoroughly removed. That this result was obtained in many instances, however, there can be no doubt.

In 1890 I operated upon 3 religious sisters, one in May, another in June and still another in November. In only one of these cases has there been a recurrence. This was in March, 1906, that is, sixteen years after the operation, when there appeared in the abdomen numerous nodules presumably involving the various abdominal viscera. They were hard and fixed. She died September 2, 1906. No autopsy was permitted.

This brings up the question of what we are to consider a cure. I think it must be conceded that the three-year limit usually put upon these cases is altogether too short to determine the end result. While in most instances a patient remaining entirely well for three years is quite apt not to suffer from further recurrence, the exceptions to this rule are by no means rare.

A woman operated upon by me December 19, 1888, when in her thirty-seventh year of age and in whom a scirrhus carcinoma of the breast had been present for about a year, showed no further signs of malignant disease until the spring of 1901. She died June 17, 1901, of malignant invasion of the liver, the

autopsy showing this organ to have been converted into a mass of malignant nodules of varying size from a pinhead to that of a large marble. All of the other organs seemed to be free from malignancy.

Withal, however, as we review the results of operative procedure undertaken for carcinoma of the breast, we can warrant the assertion that the present operative technique developed as it has been along the lines of pathologic research has fully verified our expectations and justifies the statement that except in the very acute cases a timely operation radically performed will completely remove the carcinomatous disease and prevent recurrence in the majority of cases.

THE END RESULTS FOLLOWING OPERATIONS FOR CARCINOMA OF THE BREAST.

BY JOHN CHADWICK OLIVER, M.D.,

OF CINCINNATI, OHIO,

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I HAVE assumed in preparing this article that one is expected to confine his observations to patients upon whom he has operated and to give the results of his personal experience. It has been utterly impossible for me to obtain "the end results" in such a large number of cases operated upon in the charity wards of the hospitals that it seems necessary to omit any reference to patients who could not be followed after they left the hospital. I have therefore omitted from consideration all patients except those private cases whose subsequent histories could be accurately obtained either from personal observation, or by correspondence with their family physicians. One cannot present a complete list even of this class of cases, either because some of the patients have removed to new localities or the physician who referred the patients to me may have died or removed from his original location.

The histories of the patients herewith reported are complete up to April 1, 1907, and I am sure that each statement is based upon authentic information. A tabulated statement is appended for convenience of reference. No case is reported which has not passed the three-year limit or has died before the expiration of that period of time. It is possible that the statistics herewith given are somewhat better than has been the average in my work. I believe this to be true, because the patients grouped in this report represent the more intelligent class of people, as well as those best able to care for themselves.

The complete histories of 35 patients with carcinoma of the breast are presented herewith. Twenty-two, or 62.85 per cent., are dead from recurrence of the disease, while 12

SYNOPTICAL TABLE OF CASES OF CARCINOMA OF THE BREAST.

Number.	Name.	Time between discovery and operation.	Breast affected.	Segment of breast involved.	Rapidity of growth.	Glandular involvement at time of operation.	Time of recurrence.	Sites of recurrence.	Time between operation and death.	Alive.
1	Mrs. B.....	15 months.	R.	Upper, outer.	Slow.	Extensive.	6 months.	Axilliary glands op. breast skin.	2 y., 2 m.	
2	Miss S.....	1 year.	R.	Whole breast.	Rapid.	Very extensive.	3 months.	Axilla and stomach.	6 months.	
3	Mrs. F.....	3 months.	R.	Upper, outer.	Rapid.	Extensive.	3 months.	Local and neck.	2 years.	
4	Mrs. D. ...	1 year.	R.	Upper, outer.	Slow, 10 m. Rapid, 2 m.	Extensive.	3½ months.	Axilla, liver and pleura.	4 months.	
5	Mrs. A. ...	1 year.	L.	Upper, inner.	Rapid.	Slight.	9 months.	Local and spine.	11 months.	
6	Mrs. B.....	3 years.	R.	Upper, outer.	Slow.	Extensive.	4 weeks.	Brain.	5 weeks.	
7	Mrs. B.....	6 weeks.	R.	Upper, inner.	Very rapid.	Extensive.	6 months.	Liver and stomach.	14 months.	
8	Mrs. C.....	20 years, active 1 yr.	L.	Upper.	Very slow, then rapid.	Well marked.	1½ years.	Liver.	21 months.	
9	Mrs. K. ...	6 months.	R.	Lower, middle.	Rapid.	Well marked.	14 months.	Axillary glands.	.....	Well, 10½ yrs.
10	Mrs. V.....	1 year.	R.	Lower, middle.	Slow.	None.	.....	.....	.....	Well, 10 years.
11	Miss K. ...	1 year.	R.	Outer, middle.	Slow.	Well marked.	13 months.	Opposite breast.	.....	8½ after 1st; 7 after 2 oper.
12	Mrs. R. ...	9 months.	R.	Outer, middle.	Medium.	Well marked.	18 months	Abdominal viscera.	22 months.	
13	Mrs. P.....	3 months.	L.	Upper, outer.	Rapid.	Very extensive.	1 year.	Spine.	18 months.	
14	Mrs. P.....	6 months.	R.	Upper, outer.	Rapid.	Slight.	2 years.	Scalp.	3½ years.	
15	Mrs. W....	5 weeks.	R.	Lower, middle.	Rapid.	Well marked.	3-4 years.	Chest.	5 years.	
16	Mrs. M. ...	6 months.	.....	.....	Rapid.	Slight.	3½ years.	.....	4 years.	
17	Mrs. G.....	18 months.	R.	Central.	Slow.	Slight.	4¾ years.	Local.	.....	Well, 6 years.
18	Mrs. T. ...	2 years.	R.	Lower, inner.	Slow.	Very extensive.	6 months.	Stomach.	6 months.	
19	Mrs. H. ...	2 years.	R.	.....	Slow.	Well marked.	Incom. removal.	Axilla.	.....	Well, 4 y., 3 m.
20	Mrs. W....	4 months.	R.	Upper, outer.	Rapid.	Absent.	None.	.....	.....	Well, 5 years.
21	Miss F.....	1 year.	R.	Upper, outer.	Rapid.	Very extensive.	1½ years.	Liver, kidney, left breast.	2 years.	
22	Mrs. DeC..	3 months.	R.	Lower, outer.	Rapid.	Slight.	.....	.....	.....	Well, 3½ years.
23	Mrs. B.....	3 years.	R.	Upper, outer.	Slow.	Well marked.	3 months	Local and lung.	1 year.	
24	Mrs. B.....	8 months.	R.	Upper, outer.	Rapid.	Extensive.	.....	.....	.....	Well, 3½ yrs.
25	Miss H. ...	1 year.	L.	Whole gland.	Rapid.	Very extensive.	9 months.	Not known.	15 months.	
26	Miss S.....	2 years.	R.	Whole gland.	Slow.	Slight.	.....	.....	.....	Well, 3 y., 1 m.
27	Mrs. P. ...	15 months.	L.	Whole gland.	Medium.	Very extensive.	5 months.	Not known.	9 months.	
28	Mrs. W....	5 months.	L.	Whole gland.	Rapid.	Slight.	.....	.....	.....	Well, 3 years.
29	Mrs. R. ...	6 months.	R.	Lower, outer.	Rapid.	Slight.	.....	.....	.....	Well.
30	Mrs. S.....	8-10 months.	R.	Lower, outer.	Rapid.	Very extensive.	4 months.	Lung, skin local.	7 months.	
31	Mrs. McN.	10 years, active 1 yr.	L.	Lower, inner.	Slow.	Very extensive.	1½ years.	Above clavicle.	.....	With recurrence
32	Miss F.....	1 year.	R.	Whole gland.	Very rapid.	Very extensive.	4 months.	Local lung, other breast.	7 months.	
33	Mrs. K. ...	1 year.	R.	Middle, outer.	Rapid.	Well marked.	8 months.	Spine.	1 y., 8 m.	
34	Miss M. ...	1½ years.	R.	Upper, outer.	Rapid.	Slight.	4 months.	Op. breast, stomach.	1½ years.	
35	Mrs. W....	1 month.	Both.	Lower, outer (L.), middle, outer (R.).	Rapid.	Marked on left side.	.....	.....	.....	Well, 5½ years.

are alive and well from three to ten and one-half years after operation (34.28 per cent.). One is alive after more than three years, but she is at present afflicted with an inoperable recurrence to which she will undoubtedly succumb in the near future.

The radical operation, with removal of both pectoral muscles, but without cleaning out of the supraclavicular region, was performed thirty times. The breast was removed and the axilla cleared out without removal of the pectoral muscles seven times. (The two additional operations are accounted for by the fact that the remaining breast became involved in two patients and these were subsequently removed.) Ten of the 30 patients upon whom the radical operation was done have recovered (33⅓ per cent.), while 4 of the 7 upon whom the simpler operation was done are now alive and well (57.15 per cent.). These figures are misleading because in two instances a simple operation was done upon the remaining breasts after radical operations had been done upon the opposite ones. It is rather remarkable that both of these patients recovered and have remained well—one seven and one-half years, and the other five and one-half years after removal of the second breast.

These statistics seem to prove that recurrences and deaths from carcinoma of the breast are unusual after the patient has remained well for three years after the operation. In but 3 of the cases has death from carcinoma occurred after three years; these lived respectively five, four and three and one-half years.

Three patients developed recurrences or metastases after three years; these appeared in four and three-quarters, three and one-half, and three and one-half years after operation. One of these cases is alive and well one year after the removal of a local recurrent growth. The author has met with one fatal recurrence in the axilla fourteen years after the breast had been removed.

These very late recurrences open up the question as to what should be called a recurrence and what should be regarded

as a new development of carcinoma. A discussion of this question is not in order under the present circumstances because all such developments must be regarded as recurrences so far as the purpose of this discussion is concerned.

Two or more operations were performed upon 8 of the 35 patients, the secondary operations having for their object the removal of local recurrences of the disease. Three of these are alive and well more than three years after the last operation.

Twenty-one of the 35 patients operated upon had known of the existence of a tumor in the breast for one year or longer. One patient had had a lump in her breast for upwards of twenty years, but it had remained quiescent until one year preceding the operation. Another lady had known of the existence of a tumor in her breast for ten years, but there were no signs of activity until about six months before the operation. In each of these patients the tumor grew rapidly during the active period and malignancy was well marked. Fourteen of the patients who had known of the existence of a tumor for one year or more died (66⅔ per cent.). One is alive with an inoperable recurrence, and 6 (28.5 per cent.) are alive and well more than three years after operation.

Eight patients knew of the existence of a tumor from six to twelve months prior to operation. Four (50 per cent.) are alive and well; four (50 per cent.) are dead.

Six had been aware of the presence of a tumor for a period of less than six months. Two (33⅓ per cent.) are alive and well; four (66⅔ per cent.) are dead.

The figures seem to indicate that one may not be able to judge of the prognosis very accurately merely by the length of time the patient has known of the presence of a tumor in the breast. It must always be borne in mind, however, that a patient's statement on this point is not apt to very accurate. When this testimony comes from the family physician, or from members of the patient's family it assumes much greater importance. The time given by the patient is always short of the real period of existence.

One remarkable case was that of a lady who had known of the existence of a tumor in her breast for two years. She consulted her local physician and he removed part of the breast, the incision not being sufficiently wide of the involved tissues to prevent an early recurrence. I made a radical operation one year later, and then removed a local recurrence nine months after the second operation. The patient is alive and well four and one-half years after the third operation (Case XIX).

Recurrence above the clavicle took place in but 2 of the 35 cases. This was less frequent than were recurrences in the opposite breast (5 cases).

Lymphœdema of the arm supervened in 5 of the patients. Three of these died in less than three years; one is alive but with extensive recurrences, and very extreme lymphœdema (Case XXX). The swelling gradually disappeared under treatment in the remaining patient (Case XX).

The function of the arm is good in all of the surviving patients. None of them complain of weakness or inability to use the member.

Twenty-eight of the patients comprising the material for this report were married, 7 were spinsters. Ten of the married and 2 of the single women recovered (36 and 28.6 per cent. respectively).

Statistics based upon this very limited number of cases indicate that the location of the primary growth has some bearing upon the prognosis. Central growths and those located in the lower third of the breast give a much larger percentage of recoveries than do growths located elsewhere.

The average duration of life after operation (in fatal cases) was twenty months; the extremes being five years, and five months.

The average time of recurrence was fourteen and one-quarter months—the extremes being fifty-six and three months.

An estimation, such as the above, based upon the mere existence of cancer of the breast without any consideration of the actual conditions present at the time of operation will

give a very fair idea of the average results obtainable in the general run of cases, without any elimination of cases unsusceptible of cure through operative measures. One may, however, in fairness exclude from these statistics those cases in which operation was simply undertaken as a palliative measure, and thus obtain a better idea of what results may be accomplished in cases more carefully selected. This more careful discrimination is only possible through more careful education of physicians and of the general public. Fourteen of the 35 cases in this report were beyond the possibility of cure through operation, and in each of these cases operation was undertaken with the hope of prolonging life or to remove offensive, ulcerated breasts. If we subtract these 14 cases and estimate our mortality upon the cases in which there was a reasonable hope of success we then have 21 patients, 12 of whom recovered—a percentage of recovery of about 57.6.

The matter of prognosis in an individual case will always remain a doubtful one, even though the surgeon has had a very considerable experience with this class of cases. Seemingly favorable cases sometimes progress to a fatal termination, whereas one is sometimes pleasantly surprised by having an unpromising case go on to recovery.

The most potent factor bearing upon prognosis is the character of the growth. The richly cellular, rapidly growing, soft, succulent carcinomata are much less amenable to surgical treatment, even when seen early in the course of the disease, than are the more fibrous, slowly growing, hard varieties of the disease. A successful outcome is not probable in the former variety unless operation is undertaken very, very early, because secondary foci of development are planted soon after the primary growth makes its appearance.

One is justified in looking upon the operative treatment of cancer of the breast as being far from an ideal method of treatment, even with the extensive removals practiced at the present time. The hope for the future lies in better prophylaxis and in a better knowledge of the nature of the disease.

CARCINOMA OF THE BREAST.*

A STUDY OF THE PATHOLOGICAL CONDITIONS AND THEIR RELATION TO THE QUESTION OF RECURRENCE.

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My hospital cases have been included in the report made from the Massachusetts General Hospital. The following report concerns only my private cases down to the year 1904. In this series were many advanced cases in which the operation was a desperate effort to prolong life. There was no selection of cases, operation being done in every case that offered except in one where the co-existence of advanced heart disease and a large adherent carcinoma led to palliative efforts with the X-ray. The cases were all carefully studied pathologically and the after history has been closely followed. There were forty-two cases. All recovered from the operation and of these nine are entirely free from recurrence. The time elapsed since operation in these nine cases has been in 1 case 4 years, 1 case 5 years, 1 case 7 years, 1 case 8 years, 2 cases 10 years, 1 case 11 years, 1 case 14 years, 1 case 19 years.

Five other cases are still living though they have had a recurrence of the disease. One of these was operated three years ago, three of them were operated four years ago, and one five years ago.

The remaining twenty-eight cases have died of the disease. Of these seventeen died in one year. Two lived two years. One lived three years. Two lived four years, and six lived five years.

Of the nine cases that are well without recurrence the pectoral muscles were removed in two. In the remaining seven the breast and axillary contents were removed without removal of the muscles.

* Read before the American Surgical Association, May 8, 1907.

TABLE I.—NON-RECURRENT CASES

No.	Age.	Name.	Extent of involvement.	Duration.	Date of operation.	Magnitude of operation.	Variety of carcinoma.	Time elapsed.
1	About 50	Miss H.....	.....	Some months.	Nov., 1888.	Breast removed and axilla cleaned out.	Paget's disease.	19 years.
2	54	Mrs. S.....	Nodule size of horse-chestnut. No glands in axilla.	10 years.	Dec., 1893.	Entire breast, axilla cleaned out and connective tissue between breast and axilla removed.	Scirrhous cancer. No infected glands found.	14 years.
3	60	Miss S.....	Small nodule.	Recent discovery.	Apr., 1896.	Breast removed and axilla cleaned out.	Scirrhous cancer. No infected glands found.	10 years. Died in 1906 of pneumonia.
4	About 36	Sister A.....	Chronic fibrous thickening; one point size of pea showed scirrhous cancer.	Just discovered.	July, 1896.	Whole breast and axillary contents removed.	Scirrhous cancer. No infected glands found.	11 years.
5	52	Mrs. W.....	Small nodule in breast.	Some weeks.	July, 1897.	Breast removed and axilla cleaned out.	Carcinoma of adenomatous type. Two lymphatic glands show metastasis.	10 years.
6	About 55	Mrs. B.....	Irregular rounded growth 2.5 to 3 cm. in diameter. Skin not involved. No glands in axilla.	Recent discovery.	Apr., 1899.	Breast and axillary contents removed.	Plexiform medullary cancer. No infected glands.	8 years.
7	About 67	Mrs. M.....	Nodule deep in upper outer quadrant 1.5 cm. in greatest diameter. No glands in axilla.	Recent discovery.	Feb., 1900.	Breast removed and axilla cleaned out.	Adenocarcinoma of mild type. No affected lymph nodes found.	7 years.
8	32	Mrs. P.....	A dense nodule about 2 cm. in diameter. Commencing infection of lymph nodes.	Few months.	Oct., 1902.	Breast and pectoralis major removed, axilla cleaned out, dissection carried as far as subscapular vessels.	Early cancer of tubular type of alveoli. One lymph node affected.	5 years.
9	About 45	Mrs. W.....	.....	.....	Apr., 1903.	Breast and axillary contents removed with pectoralis major and minor and all glands and tissue up to clavicle.	Carcinoma. Lymph nodes enlarged.	4 years.

In the five cases still living with recurrence the muscles were removed with the breast and axillary contents.

Of the twenty-eight cases that have died the muscles were removed with the breast and axillary contents in twelve cases.

In the remaining sixteen cases the breast and axillary contents alone were removed.

Nature of Growth.—In the nine non-recurrent cases the disease was usually of a mild type. In Case 1 it started as a Paget's disease of the nipple and at the time of removal a cancerous nodule was appearing in the breast beneath. Three of the other cases had carcinoma of adenomatous type. Three had small scirrhous cancers.

One had a small plexiform medullary carcinoma and in one case of unmistakable carcinoma the pathological report has been mislaid and cannot be found. In six of these cases careful search failed to show any infected lymph nodes. In the other three moderate infection of lymph nodes was found. In two cases, Nos. 1 and 7, of the non-recurrent series, a little epithelioma of the face co-existed with the breast cancer. In Case 1 after fifteen years a second epithelioma appeared on the opposite side of the face.

In the thirty-two cases where the disease recurred the pathologist failed to report condition of glands in three cases. In the remaining twenty-nine cases there were but three cases in which at the time of the first operation the pathologist reported a failure to find infected glands.

From this it will be seen that the instances of non-recurrence were in cases of localized disease which had not or had only just begun to invade the lymphatic system. On the other hand in the recurrent cases, with but three exceptions the lymphatic system was already seriously involved. It is interesting to note that in two of these three cases in which infected lymph nodes were not found there was no local recurrence nor involvement of neighboring lymphatics, but the symptoms pointed to a distant internal secondary growth. In the third of these cases the recurrence was in the supraclavicular glands.

Case 19 was interesting from the fact that this patient

TABLE II.—RECURRENT CASES.

No.	Age.	Name.	Extent of involvement.	Duration.	Date of operation.	Magnitude of operation.	Variety of carcinoma.	Recurrence.	Result.
1	28	Mrs. P.....	Lump as large as hen's egg over edge of sternum skin adherent. Glands in axilla.	2 to 3 years.	1885.	Breast and axilla.	Border line between medullary and scirrhous cancer. Infected glands found.	Local recurrence.	Died. No date.
2	About 42	Mrs. G.....	Tumor beneath nipple, which was retracted and hard. Axillary glands.	6 months.	May, 1889.	Breast and axilla.	Cancer with implication of axillary glands.	Operated again in Oct., 1889. Local recurrence in axilla.	Died in 1890?
3	48	Mrs. H.....	Small nodule in outer part involving skin, 2 pea-sized nodules near by. In axilla small mass of medullary-looking glands.	4 months.	March, 1890.	Breast and axilla.	Scirrhous cancer of breast and axillary glands.	Probable.	Died in 1892 in England of pleurisy.
4	About 60	Mrs. S.....	Nodule size of pecan nut. Glands in axilla.	3 months.	1890.	Breast and axillary contents.	Scirrhous cancer. Glands in axilla affected.	Probably first in lung.	Died in 1891 of recurrence
5	60	Mrs. L.....	Dense retracting nodule outside of nipple.	Just noticed.	Oct., 1891.	Breast removed. Axilla dissected.	Medullary cancer. No infected glands found.	Oct., 1905. Operation for recurrence. Supraclavicular.	Died in 1897 from recurrence.
6	.....	Miss F.....	Large retracting nodule. Axillary glands much enlarged.	.....	Nov., 1891.	Breast removed. Axilla dissected.	Cancer. Enlarged and infected axillary glands found.	Dec., 1894. Probably in mediastinum.	Died in 1895.
7	60	Mrs. H.....	.....	.....	July, 1892.	Breast removed. Axilla dissected.	Carcinoma.	Feb. and July. Operation for recurrence.	Died?

8	40	Miss B.....	Nodule beneath nipple entire thickness of breast and through into fascia. Glands in axilla.	Some months.	Sept., 1892.	Breast removed. Axilla dissected.	Carcinoma. Numerous infected glands in axilla.	Small cancerous part removed from axilla in 1897.	Died.
9	About 50	Mrs. M.....	Nipple retracted. Implication of lymph glands.	8 months.	1894.	Breast removed. Axilla dissected.	Diffuse scirrhous cancer with implication of the lymphatic glands.	Rucerrence in liver and elsewhere.	Died one year later.
10	54	Mrs. G.....	Large retracting nodule. Axillary glands enlarged.	9 months.	1894.	Breast removed. Axilla dissected.	Cancer. Glands infected.	Operation for glands above clavicle in 1895.	Operation in angle of jaw. Died in 1895.
11	.....	Mrs. D.....	Contracted nodule size of large cherry beneath nipple. Several glands in axilla.	.....	.....	Breast removed. Axilla dissected.	Medullary cancer with secondary implication of lymph glands.	Operation for recurrence Mar., 1898. Probably in chest.	Died one year after recurrence.
12	48	Mrs. H.....	One small nodule of carcinoma in middle of breast.	Recently discovered.	March, 1896.	Breast and entire axillary contents removed.	Typical carcinoma.	1st in pectoralis muscle Apr. 1897. Nodules removed at different times. Metastases to stomach and brain.	Died in April, 1901.
13	60	Mrs. M.....	Diffuse fibrous thickening gland. Small retracting nodule near nipple. Gland in axilla.	Few weeks.	June, 1896.	Breast and axillary contents removed.	Scirrhous cancer. 1 small infected gland found.	Sept., 1896. Nodules removed.	Died in fall of 1897.
14	45	Miss P.....	Diffuse and ill-defined growth occupying considerable part of breast.	Recently noticed.	Dec., 1897.	Breast removed and axilla dissected.	Medullary cancer. Numerous lymph glands infected.	September, 1899. In chest.	Died in 1899.

TABLE II.—RECURRENT CASES.—*Continued*

No.	Age.	Name.	Extent of involvement.	Duration.	Date of operation.	Magnitude of operation.	Variety of carcinoma.	Recurrence.	Result.
15	58	Mrs. L.....	Extensive hard mass in middle of breast.	Some months.	July, 1898.	Breast removed and axilla dissected.	Carcinoma with metastases in axillary fat tissue.	Recurrence within a year. Local and general.	Died in 1899.
16	45	Miss G.....	Large nodule in breast and palpable glands in axilla.	Some months.	Sept., 1898.	Breast removed and axilla dissected.	Typical carcinoma. 1 small nodule of carcinomatous tissue found in neighborhood of large artery.	Recurrence in pleura.	Died October, 1899.
17	50	Mrs. P.....	Diffuse infiltrating growth occupying greater part of corpus mammæ. Axillary glands enlarged.	Some weeks.	Jan., 1901.	Breast and costal portion of pectoralis major completely removed and axilla dissected.	Medullary cancer with lymphatic and probably venous infection.	July, 1904, in edge of sternum or rib.	Died August, 1906.
18	52	Mrs. A.....	Diffuse thickened area occupying about 6 cms. in generally fibrous breast. Lymph nodes in axilla.	Just noticed.	Oct., 1901.	Breast and costal portion of pectoralis major removed. Axilla dissected.	Scirrhous cancer with secondary infection of the lymph nodes.	Operation for recurrence in skin May and Oct., 1902, 1903, 1904.	Died in Mar., 1906.
19	71	Mrs. B.....	Small breast with retracted nipple, 2 flat elevated infiltrations from skin. Other breast removed in 1872.	Some months.	Feb. 1902.	Breast and pectoralis major removed. Axilla dissected.	Scirrhous cancer with secondary infection of skin	Dec., 1904. Many supraclavicular glands.	Died October, 1906.
20	48	Mrs. E.....	Beneath nipple retracting fibrous growth about 2 cms. in greatest extent.	.....	April, 1902.	Breast and both pectoralis muscles removed. Axilla cleaned.	Scirrhous cancer and secondary infection of axillary lymph glands.	Soon.	Died in Oct., 1902.

21	About 68	Miss N.....	Dense nodule 1.5 cm. in diameter No glands in axilla.	.....	June, 1902.	Breast and pectoralis major and minor removed. Axilla cleaned.	Cancer of scirrhous type. No infected lymph nodes found.	Recurrence probably in spinal column, 1904.	Died soon after in 1904.
22	About 58	Mrs. R.....	Diffusely fibrous breast and in it a dense nodule 2 cms. in diameter. Glands in axilla.	Some months.	Oct., 1902.	Breast with pectoralis major and minor removed. Axilla dissected.	Scirrhous cancer and secondary infection of axillary lymph nodes.	June, 1903. Local recurrence.	Died.
23	About 50	Mrs. B.....	Hard, diffuse, ramifying growth. Axillary glands.	Some weeks.	Dec., 1902.	Breast with pectoralis major and minor removed. Axilla dissected.	Diffuse adenocarcinoma with infection of axillary glands.	Aug., 1904. Several large glands in neck.	Died in 1907.
24	42	Mrs. H.....	A hard nodule about 2–3 cms. in diameter.	10 months.	Dec., 1902.	Breast with axillary contents removed with sternal portion of pectoralis major.	Adenocarcinoma of rather a scirrhous type with commencing axillary infection.	May, 1907. Recurrence along axillary vein and at root of neck.	Living.
25	75	Mrs. S.	Breast almost entirely occupied by a hard tumor. Axilla contained several hard nodules.	3 months.	March, 1903.	Breast and pectoralis muscles removed. Axilla cleaned.	Medullary carcinoma with secondary involvement of lymph channels and pectoralis muscle.	July, 1903. Local recurrence.	Died in Dec., 1904.
26	51	Mrs. D.....	Hard tumor 4 cms. in diameter and second nodule 1–1½ cm. near axilla border. Several glands in axilla.	.....	March, 1903.	Breast and pectoralis muscle removed. Axilla cleaned.	Carcinoma. Several infected nodules found in axilla.	July, 1906. Arm much swollen. Much pain.	Living.
27	About 63	Miss H.....	.....	.....	April, 1903.	Breast and pectoralis major and minor removed. Axilla cleaned.	Carcinoma.	Sept., 1905, recurrent nodules in skin and lymph node removed in 1905 and twice in 1906.	Living.

TABLE II.—RECURRENT CASES.—*Continued*

No.	Age.	Name.	Extent of involvement.	Duration.	Date of operation.	Magnitude of operation.	Variety of carcinoma.	Recurrence.	Result.
28	About 58	Mrs. C.	Tumor about 4 cms. in diameter beyond limit of mammary gland in direction of axilla.	Some weeks.	June, 1903.	Breast and pectoralis muscles removed. Axilla cleaned.	Typical carcinoma. A small metastases in one lymph gland.	First in Sept., 1905. Operation in 1905 to 1906.	Living.
29	65	Mrs. S.	Outer side of nipple hard tumor 10–15 cm. in diameter, not adherent. Several nodules in breast.	2 years.	Oct., 1903.	Breast removed with pectoralis muscles. Axilla cleaned.	Adenocarcinoma with involvement of axillary glands, gland under pectoralis muscle.	Dec., 1904. Much pain in chest both sides.	Died.
30	57	Mrs. DeW....	Large pendulous breast with hard lump in upper part. Glands in axilla.	7 months.	Jan., 1904.	Breast removed with pectoralis muscles. Axilla dissected.	Scirrhous cancer with cancerous axillary lymph nodes.	Aug., 1904. Local and general recurrence.	Died.
31	About 65	Miss C.	Ulcerated surface over tumor about size of 5-cent piece. Several enlarged glands in axilla.	.....	Jan. 1904.	Breast and pectoralis major removed, pectoralis minor cleaned on both surfaces. Axilla dissected.	Scirrhous carcinoma. No infected glands found.	Jan., 1907. Suspicious rheumatic pain and cachexia. No local recurrence.	Living.
32	About 36	Mrs. H.....	Indurated growth about 3 cm. in diameter. Breast tissue everywhere enlarged and fibrous. Several large lymph nodes.	Few weeks.	Feb., 1904.	Breast and pectoralis major and minor removed and tissue in subscapular and subclavicular regions dissected. Axilla cleaned.	Medullary cancer with gen. epithelial proliferation. Secondary infection of of lymph nodes.	May, 1906. Beneath clavicle.	Died January, 1907.
33	.....	Mrs. B.....	Outer portion breast occupied by diffuse hard growth infiltrating the tissue in all direcitons. Glands in axilla.	.....	July, 1894.	Breast and pectoralis major and minor glands removed from apex of axilla and surface of subscapula.	Diffuse medullary carcinoma with involvement of axillary glands.	Recurred locally soon.	Died 1905.

had had the other breast removed thirty years before for what was believed to be a cancer; and this belief was strengthened by the fact that recurrent nodules had been removed on three occasions since; the last one fourteen years before the second breast developed the disease. Unfortunately no microscopical examination had been made of any of these specimens.

From this study it appears that in this small series of cases the question of recurrence depended more on the character of the growth, and the degree of involvement of the lymphatic system than upon the thoroughness of removal. If the disease had affected many lymphatic glands it was sure to recur even after a thorough removal of all of the muscles and axillary contents. On the other hand, in the nine cases that did not show a recurrence the lymphatic involvement was slight in all while in seven out of the nine the muscles were not removed.

These facts give us a basis for a somewhat greater accuracy in prognosis, but should not be used as arguments against extensive radical operations; for it is impossible in any given case to tell how far the cancer cells have penetrated the surrounding lymphatics and the chance of getting ahead of the disease is improved when the efferent lymphatics have been removed to as great a distance as possible.

In Case 12 the nodule in the breast was small and so situated in the centre of the gland that I felt safe in leaving the pectoral muscles. The recurrence occurred in the muscle thus mistakenly spared, and since that experience I have removed the muscle in all cases.

Attention should, I think, be directed to the danger of recurrence from the self inoculation of the wound with cancer cells set free during operation. This danger is to be reckoned with when a doubtful growth has been cut into for the purpose of establishing the diagnosis before proceeding to its thorough removal. If the lymphatic channels between the breast and the axillary glands or the muscles have been cut across during operation there is danger that during subsequent manipulations cells contained in those channels may be pressed out into the wound. The possibility of this occurring is a reason for

removing breast, muscle and axillary contents in one mass and for keeping the dissection outside of the lymphatic distribution as far as possible. When a cancer has been cut into for purpose of diagnosis the opening should be tightly closed before further operation is undertaken and every precaution should be taken by changing instruments, etc., to avoid inoculation.

Irrigation of the wound may be used on such occasion as an additional safeguard, and in cases where the operation has gone close to the cancer or through suspicious tissues, I have applied tincture of iodine to the surface of the wound after the manner more commonly employed in the presence of tuberculosis; and this procedure has seemed to me to prevent a quick recurrence when such appeared otherwise inevitable.

X-ray Treatment of Mammary Cancer.—In one case, above alluded to, an inoperable cancer was treated by the X-ray for nearly two years, and it was the opinion of those who watched the patient that the growth was checked and delayed by this treatment. In Case 18, several little nodules appeared in the skin six months after operation. These were promptly removed, but others soon appeared and were again removed only to be followed by still others. The X-ray treatment was then adopted, and under it several nodules disappeared and further reappearance was distinctly checked. For three years under intermittent periods of X-ray treatment the disease made little appreciable progress, but then evidence of deeper trouble in the chest and back appeared and she died four years and a half after the operation.

Case 27 is another in which the X-ray seemed to have a decided effect in retarding the growth. It is now my practice to give each patient a course of X-ray treatment immediately after the operation with the idea of destroying any bits of cancer that may have escaped removal. For this the exposures to the X-ray are made twice a week for three or four months after operation. The cases treated in this way have occurred within the past three years, and are not included in this report, as the time elapsed is too short to judge of results.

END RESULTS FOLLOWING OPERATIONS FOR CARCINOMA OF THE BREAST.

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In the present communication I wish to emphasize more especially results obtained in cases in which, at the time of operation upon the breast, the lymph nodes above the clavicle were already infected, and the supraclavicular spaces were cleared out in addition to the typical operation upon the thorax and axilla. I do this especially because of the frequency with which I have met expressions of skepticism from men of large clinical experience, as to the value of extending operative attack above the clavicle; their skepticism being based upon their apprehension of the great probability that when the supraclavicular nodes were appreciably affected, the infection had already extended into the mediastinum, so that even after the removal of the supraclavicular masses the operation would necessarily still be incomplete.

No one for a moment would dispute the increase of gravity of prognosis in a case of breast carcinoma in which the transmitted infection had reached the supraclavicular lymph nodes, but that this should always render the prognosis practically hopeless is not in accordance with clinical experience. When, therefore, my colleagues say to me that they never invade the supraclavicular region in their work for breast carcinoma, I am influenced to inquire whether they are not thereby permitting a certain proportion of cases to proceed to a continuance of carcinomatous development which a further extension of their work of eradication might have prevented.

In a study of my results in operations for breast carcinoma, published in 1900, I found that in 10 of the cases in which enlarged supraclavicular nodes were discovered and

removed, 3 remained free from recurrence. These I have been able to follow to the present time, May, 1907. One case has since died from cardiac failure at the age of seventy-five, more than seven years after operation, without recurrence of cancer. The two other are still living, free from recurrence, nine and seven years, respectively, having elapsed.

During the six years, 1901–1906, inclusive, 34 additional cases of breast carcinoma have come to operation at my hands; 5 of these were manifestly and unavoidably incomplete operations, the benefit was but partial and temporary and the steady advance of the disease was uninterrupted; one of these died on the table.

In eleven instances, application for relief had so promptly followed the discovery of the presence of the disease, that in my judgment it was proper to limit the operative attack to the clearing out of the axilla and the removal of the pectoral muscles with the affected breast and its overlying skin. The results in these cases have been so extraordinarily good that I almost hesitate to record them, for they entirely reverse all my previous experience and preconceived opinion; nine out of the 11 have thus far remained free from recurrence, periods of four years, three and a half years, two years, eighteen months in 5 instances, and six months, respectively, having elapsed. In the remaining 2 it is reported that there is now a lump in the other breast, the nature of which has not been determined. My reference to these cases is simply en passant.

It is the remaining group of cases, 18 in number, in which the evident extension of the disease at the time they first presented themselves was great enough to awaken apprehension of possible infection of the lymph nodes above the clavicle that I wish to dwell upon more particularly. In these cases, in four instances glandular masses in the neck were distinctly palpable before any section of the overlying coverings was made. Of the 14 cases in which the examining finger could not appreciate the presence of diseased nodes in the neck, the section revealed nevertheless that in 11, infected nodes were present, and that in only 3 of the number, appreciable disease

was not recognizable upon section. As to the end results in these cases:

Of the 3 cases in which the neck was opened and the supraclavicular region cleaned out without the discovery of any noticeably infected glands in the neck, all have remained well to date, at periods of five years, one and a half years, and one year, respectively.

Of the 4 cases in which the supraclavicular glands were palpable *ante operationem,* 1 case died three months after operation without further external manifestation of disease, but by progressive asthenia doubtless due to internal carcinosis, the operation evidently having been an incomplete one.

The second case one year later had developed multiple recurrent nodules in the thoracic region; these were kept under control by X-ray treatment for two years. At the end of four years she had developed a growth in the remaining breast, and was subjected to a complete operation for its removal; later. she developed intrathoracic metastases from which she died five years after the primary operation.

In the third case, a suspicious nodule developed upon the thorax within the first year after operation; this disappeared under the influence of the X-ray, and the patient thereafter remained in good health for two years, at the end of which time she died, as reported from pneumonia. The case is not altogether free from the suspicion of a carcinomatous element in the pulmonary condition.

The fourth case remains well, without suggestion of recurrence, two years after operation.

The 11 remaining cases in which the neck was opened and infected glands found to be present, although they were not palpable until after the neck was opened, belong likewise, though in a less degree than those first mentioned, to the group of neglected cases which experience has shown may be expected to differ greatly in the operative results obtained from the early-attended cases.

Among the 11 women the length of time that had been allowed to elapse after the presence of the growth was known

before accepting operation for removal, was two years in 1 case, between one and two years in 4 cases, six months in 4 cases, and one month in 2 cases only. It has been possible to follow the later history of all but one. One died from myocarditis seven weeks after the operation, leaving 9 cases to be accounted for; of these, 3 developed speedily both regional and distant metastases, the removal plainly having been incomplete, and they all died within the year; a fourth was reoperated at the end of a year for a recurrent nodule in the lateral thoracic region; no further external metastases became manifest in this case, but carcinoma of the liver developed, resulting in death three years after the primary operation; a fifth case remained well for four years, but during the fifth year—the present year—there have developed both supraclavicular and thoracic recurrences,—she is still living. Four cases still remain free from recurrence, at periods of three years, three years, two years, and one year, respectively, since operation.

In two previous papers, in 1902 and 1905, respectively, I have dwelt upon the importance of opening the base of the neck as a part of the routine operative procedures in cases of breast carcinoma. Even the limited experience contained in the comparatively small number of cases included in my own statistics, is sufficient to indicate that in a considerable proportion of cases the supraclavicular nodes become early infected, so that operations for the removal of carcinoma originating in the breast must often be incomplete if the base of the neck be not cleared of its nodes, as well as the axilla. The point of suspicion—the key to the whole situation, in many cases—is the triangle at the junction of the subclavian and internal jugular veins, where rest the node or nodes which guard the entrance to the mediastinal lymphatic paths and to which run not only the lymphatics which pass up under the clavicle from the axilla, but also an inconstant but not infrequent set of ducts which run up on the front of the thorax from the mammary region to the base of the neck, down into which they dip after running over the inner end of the clavicle.

When the neck is opened, this jugulo-subclavian triangle is first to be exposed, explored and cleaned, and from it, outwards, the lymphatic-bearing tissue can be best systematically dissected out *en bloc*.

So dense is the deep fascia at the base of the neck that, together with the overlying adipose tissue and skin, it forms a covering which renders infected nodes difficult to detect by palpation until they have attained quite a size. When such nodes have become distinctly palpable or visible, the presumption is that the infection is of long standing and of considerable extent. They are of ominous portent and fully justify the gravest prognosis. That even then the infection may still be confined to the accessible supraclavicular group, so that their extirpation may ensure a complete removal of all carcinoma-bearing tissue, has been demonstrated in enough instances to encourage surgical attempts in all but the plainly hopeless cases. Of more importance, however, is the practical recognition of the probability of the presence of infection of the supraclavicular nodes in every case of breast carcinoma of much duration or extent, and the incorporation into the general plan of operative attack, in all such cases, of an incision into the base of the neck and a systematic removal of all possibly infected tissue, even though there may be no distinct evidence to sight or touch before such incision, of the presence of such infection.

VERY LATE RECURRENCES AFTER OPERATION FOR CARCINOMA OF THE BREAST.

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WHEN Volkman more than twenty-five years ago established the triennium as the time limit for recurrence after operations for cancer, it was with the knowledge that it may return at a later period. Investigations have recently been made, especially on the Continent, by Labhardt, Koenig, Poulsen, Schroder, and Wunderli of the subsequent history of cases that have passed the three-year limit. Their facilities for such investigations have been unusual by reason of the registration laws which through official sources permit the following up of cases to the very end. From these investigations it will appear that of those who have safely passed the three-year limit about 20 per cent. succumb later to recurrence in loco or to visceral, bone or gland metastases. It would seem, therefore, that before a permanent cure can be said to have been obtained an immune period of five or six years must have been passed. But, as we shall see later, even long after this time, local glandular or visceral metastases may appear.

The mortality of even very extensive breast operations has been steadily reduced until now they can hardly be classed with the major operations. Synchronously the number of patients who remain well after three years or more has increased. The average of patients who pass the three-year limit in the hands of most surgeons who perform radical operations is but a little under 30 per cent. A three-year cure of over 40 per cent. is certainly exceptional unless conservatism is manifested in the selection of cases deemed suitable for complete operation. The age of the patient, the degree of glandular involvement, the size and rapidity of the tumor growth

and, above all, its cell elements will greatly effect the prognosis as to recurrence. Experience has taught us in the individual case to foretell with reasonable accuracy how lasting the relief afforded by operation may be.

It is altogether probable that a fair part of the improved end results latterly achieved is due to the fact that the public has for over twenty years been educated to the importance of early interference in breast cancer. It is now exceptional in the experience of anyone to encounter an ulcerated or even adherent mammary cancer, and a primary inoperable case in well settled communities is indeed *rara avis.* In advanced cases the post operative prognosis is still extremely bad. Of 31 ulcerated breast cancers Wunderli reports only 2 living after three years.

To ascribe the improved results altogether to the radicalness of the operation, I believe to be fallacious. My first case of breast amputation is still living and well after twenty-nine years, and I have two living and well operated on twenty-six and twenty-two years ago respectively. In the last of these a very severe wound erysipelas threatened the life of the patient. It goes without saying that in each of these cases the pathologic diagnosis of cancer was made. In none of them was more than an amputation with incomplete evacuation of the axilla done.

This is not in any way to be construed as advocating recession from the practice of widest possible excision now in vogue by almost everyone, but as some basis for hope even in those exceptional cases in which for one reason or another a very extensive operation is contra-indicated. On the contrary, the radical operation of to-day, if properly done, reduces considerably the danger of local recurrence, although it of course in no way can affect metastases already existing. How long these metastases may lie dormant will be seen later. The danger of the modern operation is in the inoculation of the wound by the needless manipulation of the tumor mass by an inexperienced or clumsy operator. Almost everyone who does surgery at all feels himself competent to do a breast operation,

which to do properly, in my judgment, is one of the difficult feats of surgery. I believe that I have seen relatively more cancers en cuirasse follow speedily after the radical than the older methods of operation. I also believe that if surgeons would more generally clean out the axilla as the first step of the operation, the results would be better, although I have no statistics upon which to base this view.

However much wide excisions have reduced the probability of local recurrence, this will always continue to be an obstacle in the way of getting much better results. From the statistics of seven German clinics where it was possible to follow the cases, I have figured out that local recurrence takes place in about 58 per cent. of the cases, and that of these again in 62 per cent. the recurrence appears during the first year; in 11 per cent. in the second year and only in 5 per cent. in the third year. In these percentages are included metastases in the axillary and cervical lymphatics which form but a small proportion of the total number of cases. The great preponderance of recurrences takes place in the scar or in the skin in its immediate vicinity. These facts, clearly elementary in character, are only mentioned as a predicate to the statement that after the third year freedom from local recurrence, although not assured, may at least be confidently hoped for.

Recurrences after this time become less and less frequent. Of 20 cases collected by Margraff, 12 took place in the third and fourth year, 4 in the fifth and sixth year, 2 in the seventh or eighth year, and 2 in the ninth and eleventh year. Of 17 recurrences from the clinic at Rostock, 5 took place in the fourth year, 4 in the fifth, 3 in the sixth, 3 in the seventh, and 1 each in the eleventh and thirteenth year. The latter to me seems a doubtful case since without local recurrence the cancer developed in the inguinal glands and the patient succumbed to abdominal metastases.

In the preparation of this paper I have had communications from sixty-two fellows of the society with mention of thirty-seven cases of recurrence after six years. No less than eighteen of my colleagues in the association who responded

had not seen or did not recollect cases which had recurred after five years. It is self-evident that these reports fall far short of scientific accuracy, but in a general way, from the very wide experience which they reflect, they emphasize the fact that after that period recurrences are certainly unusual.

Of late recurrences, Warren, Carson, Bevan, and Senn each report a case of eight years; Shepherd 1 of nine and one of eleven, the latter in the supraclavicular glands; Ochsner 1 of eleven years; Bell 1 of ten years; Bloodgood 1 of fifteen years; Moore 1 of twelve years; M. H. Richardson two of seven and 1 of eight years; Vanderveer 1 of twelve years and six months; McLaren 1 of thirteen years, exitus of general carcinoma; Pilcher 3 of five or six years; Coley 1 of seventeen years; Armstrong 1 of fifteen years; Bull 1 in loco after eight years and 1 of general metastases after nineteen years. Curtis has recently reported 5 cases of late carcinomatous metastases. Of 27 cases kindly abstracted for me by Harrington from his service, there was 1 dying eleven years after operation from cerebral hæmorrhage without local recurrence. The patient was seventy-five. There was no reason for believing that the apoplexy was due to hæmorrhage. There was no case of late recurrence.

Willy Meyer communicates a case of gastric cancer appearing six years after breast amputation without local recurrence, and Tiffany one of intestinal and omental cancer, twelve years after breast operation without local recurrence. Finney had 1 of cancer of the rectum seven years after the operation without local recurrence, and Jacobson communicates 2 cases of abdominal carcinoma developing thirteen and sixteen years after the primary operation. In neither case was there local recurrence. In the one case multiple metastases were found in the liver without any other organic abdominal disease. Halsted reports 1 case of cancer of the pleura developing eight years after the operation without recurrence in the scar, and Mayo 1 of cancer of the other breast which developed seven years after the first operation.

My personal experience with late recurrences or metas-

tases has been limited to a few cases. There may have been others of which I have no knowledge.

Mrs. S. L., aged forty-eight. Cancer of the right breast. Amputation with removal of axillary lymphatics in April, 1881. Continued well for four years when symptoms of cancer of the spine developed, to which she succumbed six years after the operation.

I have seen a second case of metastatic spinal cancer in a woman of forty. The symptoms developed about eighteen months after the primary operation for breast cancer. The patient died ten months after the inception of the spinal symptoms. There was no local recurrence.

In a personal communication DaCosta mentions a case of spinal cancer which developed nine years and ten months after an operation by the younger Gross, who was a pioneer in the practice of wide excision of breast cancers. There was no local recurrence.

A doubtful case was that of Mrs. L., on whom a radical breast operation was done at the Jewish Hospital January 31, 1897. She continued well for nearly six years when without local recurrence cerebral symptoms developed. Their onset was sudden and consisted of right hemiplegia and aphasia. There was no loss of consciousness. The patient lived four months. I would exclude this from the list of metastases and consider it one of ordinary cerebral embolism were it not for the following case recently in my service at the Cincinnati Hospital.

The patient, a lad of nineteen, entered with a rapidly growing periosteal sarcoma of the upper end of the right humerus. On the day before the one set for operation the patient complained of intense headache, became comatose within twenty-four hours and died thirty hours after the onset of the cerebral symptoms. There was no paralysis of the extremities. The autopsy revealed a metastatic growth as large as an olive in the left cerebellar hemisphere. A hæmorrhage had broken through the growth under the pia and into the fourth ventricle. Similar pigmented metastases were found in the lung, the spleen, the kidneys and one in the right pararenal fat.

Of cancer of both breasts I have had two cases. In one the second breast was removed four years and two months after the first operation. Recurrence ensued within a year.

The second case was that of a woman of forty-two, the mother of four children. The right breast and axillary glands were removed at her home in Peru, Ind., in June of 1887. In 1894 the left breast was removed for scirrhus. Sixteen months after this operation a cancerous growth was removed from the axilla of the side first operated upon. There has been no recurrence since and now the patient is enjoying the best of health.

Of the appearance of carcinoma in other organs after breast operations, I have had but one case and even in this the later history did not come directly under my observation. It was that of a women of forty-eight who developed a cancer of the uterus seven and a half years after the first operation. Her physician could not persuade her of the independent nature of the uterine cancer and she refused operation.[1]

A remarkable case as to the length of the interval between operation and recurrence is that which follows:

I first saw Mrs. F. in March, 1904. She was then sixty-three years of age. She had given birth to five children. In May, 1883, Prof. T. A. Reamy at his private hospital removed the right breast for carcinoma of the scirrhus type. The axillary glands were not invaded and the operation consisted of wide excision of the breast without opening the axilla. A microscopic examination confirmed the clinical diagnosis. The patient remained well until four months before her visit to me, when she observed a painless lump in the scar. The tumor grew rapidly from its first appearance.

Her condition at the first examination was one of perfect health except for the cancer recurrence in the region of the right breast. The scar, very irregular and broad, was a little over

[1] In May, 1893, the writer removed a round-celled sarcoma from the left axilla of a man seventy-three years of age. Without any local recurrence, a tumor developed on the outer side of the left arm, which I removed in May, 1907. The tumor proved to be a melano sarcoma.

6 inches in length and had evidently formed after healing by granulation. Here an irregular nodular tumor of stony hardness and adherent to the muscle was found. The skin over it was purplish in spots, adherent to the mass and quite glistening. The tumor could just be covered with the palm of the hand. Except for the patient's statement, which there was no reason to question, nor by reason of her very superior intelligence was there cause for doubting the accuracy of the observation, it did not seem possible that such rapid growth could have taken place in four months. The axillary glands were not at all involved. On April 2, 1904, at the Jewish Hospital the entire scar together with the tumor and the sternal part of the large pectoral muscle was removed. By plastic operation and slight skin grafting the wound was closed. The axilla was not disturbed. An examination of the specimen showed it to be a scirrhus recurring in the scar. On April 23, 1905, two recurrent nodules were removed from the site of the scar left from the second operation. Local recurrence did not take place. Death resulted on April 9, 1907, from intra-thoracic cancer which had caused intense dyspnœa. There was no pleural effusion. Her physician, Dr. W. H. Kelley, informed me that ten days before her death a large mass could be felt in the region of the liver. On account of the condition of the patient no effort was made to accurately localize it. No autopsy was made.

So far as I have been enabled to glean from a rather extensive investigation of the literature, this case presents the longest interval of freedom from recurrence hitherto reported. The interval between operations was one month less than twenty-one years. In a personal communication Deaver informs me that he has knowledge of one case which had recurrence twenty years after the removal of the breast. Matas writes me that he saw a woman seventy-six years old who had a tumor appear in the cicatrix of an operation for breast tumor performed by another surgeon about twenty-five years before. The axillary glands which had not been removed at the first operation were not involved.

Tiffany speaks of a case recurring from time to time during a period of twenty-one years. The first operation was

done by Sir James Paget. Death resulted from cancer en cuirasse.

The summing up of the cases communciated to me and my own shows 37 developing seven years or more after the first operation for cancer of the breast. Of these 26 were clearly local recurrences and 11 were doubtful. Among the local recurrences I included those in which the regional lymphatics of the axilla, the neck or the thorax were involved. Perhaps even some of the abdominal recurrences, unless clearly primary in the viscera, may be due to retro-infection of the lymphatics. Of the cancers of the other breast there were 3 cases. To classify these as recurrences is hardly logical. The same is true of the cases of cancer of the rectum, of the stomach and of the uterus. With predisposition and environment unchanged, a primary growth may certainly occur in any organ after many years without reference to a growth elsewhere removed years before. Late metastases without local recurrence, as in a case of Bull's of ten years in the brain, of cancer of the spine after ten years and of the liver after thirteen years without local recurrence and without any recent primary growth in any other viscus, must on the other hand clearly be classified with the metastatic recurrences. Of clean local recurrences 10 occurred during the seventh and eighth years, 2 after the ninth, tenth, eleventh, twelfth and fifteenth years, and 1 each at varying intervals from fifteen to twenty-five years. Even in these late recurrences the tumor growth was in the scar or its immediate vicinity and it is worthy of record that in some of the cases of longest standing there was no axillary involvement even at the time of the recurrence. This might cast some doubt upon the nature of the growths as to cancer, although the very fact of recurrence bears out the correctness of the clinical diagnosis of the primary tumors and the pathologic findings when made. Especially in cases where the absence of axillary lymph node involvement is noted, the suspicion of a chronic mastitis or of some form of abnormal breast involution would seem justified. But here again the recurrence speaks for the malignancy of the initial growth.

The explanation of these late local recurrences is largely speculative. The trend of opinion is that since, irrespective of the length of the interval they recur with great uniformity in the scar or the skin about it, they must result from cell deposits left at the first operation where they have remained latent. Clearly as this is opposed to our notions of the activity of the cancer cell, recent investigations, notably by Peterson, have shown that retrograde changes can take place in cancer nodules chiefly through the agency of giant cells and that the operation fosters this process. If and when this process fails, recurrence ensues.

In conclusion, I am inclined to believe that all supposed very late recurrences in the scar are not such in reality, for there is one factor worthy of consideration. It is that scar tissue with its epithelial covering and deformed glandular tissue in its vicinity is subject to diseases of its own and that among them cancer is not uncommon. Why should it not occur, therefore, *de novo* in the scar of an old breast operation just as it occurs in the cicatrix of a healed gastric ulcer or in that of a torn cervix?

CARCINOMA OF THE BONES FOLLOWING CARCINOMA OF THE BREAST.*

BY HENRY R. WHARTON, M.D.,

OF PHILADELPHIA,

Surgeon to the Presbyterian and Children's Hospitals.

MRS. F., aged sixty-one years, consulted me in January, 1906, in regard to a tumor involving the left breast, which had been giving her some uneasiness for several months. Upon examination I found a distinct mass in the substance of the breast, which I considered carcinoma, and advised its removal. The breast was removed with axillary glands in February, 1906, and the patient made a good recovery. Three months after the removal of the growth the patient complained of pain in the lumbar region of left side, extending into the left thigh; this pain was intermittent. She passed out of my observation in June, when she went away for the summer, but returned to my care in October. She stated that she had suffered quite severely at times during the summer from pain in the lower lumbar region and thighs. At this time she was not able to walk well without the aid of crutches. Walking became more difficult, and she finally was compelled to abandon it entirely, although she was able to sit in a chair. After sitting for a time she complained of pain in lumbar region. Examination of the back showed no kyphosis, but there was tenderness on pressure over the lower lumbar verebræ and sacrum and pain over the trochanters. The pain also extended to the thighs as far as the knee joint. There was no paralysis of the lower extremities and the knee jerks were normal. There was no loss of power in the bladder or rectum. The pain was intermittent and was described as acute at times and sometimes dull in character. The temperature was slightly elevated for a few weeks before the patient's death. There was no evidence of any recurrence of the growth at the seat of operation.

After repeated examinations and a careful study of the case it was thought probable that her symptoms were due to a sec-

* Read before the Philadelphia Academy of Surgery, April 1, 1907.

ondary carcinomatous growth in lumbar vertebræ or sacrum. Dr. H. A. Hare, who saw the patient with me upon two occasions, was inclined to this diagnosis. During the last month of her life the patient was kept comfortable by the use of a moderate amount of morphia. Death occurred suddenly from angina pectoris on January 7, 1907.

Autopsy.—The lower lumbar vertebra was found much softened, and cord and dura were thickened. Report of the microscopical examination of the fifth lumbar vertebra, cord and dura, made by Dr. A. G. Ellis, was as follows:

"Sections from the fifth lumbar vertebra show at points marked erosion and disappearance of the osseous structure which remains only in the form of isolated, irregular fragments. In these areas is a new growth made up of spheroidal epithelial cells and an irregular fibrous stroma. The nuclei of the former react well to stains, the protoplasm is in many instances granular and fragmenting. In a few areas are fairly distinct alveoli bounded by fibrous tissue and containing masses of the described cells. Tissue of this type surrounds many of the fragments of bone and extends into the overlying soft parts.

"Sections from the spinal dura in the region of this vertebra (4) show at one circumscribed point a decided thickening. Here the membrane is twice the thickness of the remaining portion, the increase being entirely due to fibrous tissue, epithelial elements being lacking. This area corresponds to the thickening of the dura noted macroscopically at the extreme lower end of the removed portion.

"*Diagnosis.*—Fatty degeneration of heart; scirrhus carcinoma of lumbar vertebra; chronic productive pachymeningitis of overlying dura."

Dr. B. F. Curtis [1] reports a case of carcinoma of the vertebra following removal of the breast for carcinoma. In this case, seven months after removal of the breast, loss of power over the bladder and rectum was observed, the knee reflexes were lost, and there was paralysis of the parts below the line of the umbilicus. There was also kyphosis in the mid-dorsal region. Pain was not severe. Laminectomy was performed, and upon exposing the cord it was found congested; the sixth dorsal vertebra was softened and projected slightly into the spinal canal. The pressure symptoms were not relieved by the operation. The patient died sixteen days after operation.

Primary carcinoma of bone is extremely rare, whereas

[1] N. Y. Med. Record, 1898, vol. i, p. 347.

secondary metastatic carcinoma of this tissue is not uncommon. The occurrence of metastatic carcinoma of bone, following primary carcinoma of the breast, is well recognized. The infection may occur months or years after the removal of the primary tumor. The character of the secondary tumor always corresponds to that of the primary one. The infection of the bone may occur by direct extension of the growth to this tissue when it originates in tissues adjacent to the bone, as is not infrequently seen in involvement of the ribs in recurrent carcinoma of the breast.

The development of carcinoma in bone distant from the primary growth results from the localization of carcinomatous emboli, and is said to occur at that portion of the bone subjected to the greatest traction or pressure. Carcinomatous infiltration of bone causes diffuse lacunar absorption, rendering the bone soft and easily bent or broken. There may also be present at the seat of infiltration a tendency to the development of new bone tissue; this condition has been described as osteopathic carcinosis.

According to von Recklinghausen, the bones most frequently the seat of secondary metastatic carcinoma are the vertebræ, femur, ribs, humerus and cranial bones. The vertebræ are said to be not infrequently the seat of carcinomatous infection from carcinoma of the breast, but my personal observation of a large number of cases has shown only one case in which the vertebræ were involved. On the other hand, Dowd [2] reports 29 cases operated upon for carcinoma of the breast, in 5 of whom symptoms of spinal metastasis developed. It should, however, be noted that no autopsies were recorded in any of these cases.

My experience with secondary carcinoma of the bone, following carcinoma of the breast, located at points not adjacent to the primary growth, has been confined to the following cases:

CASE I.—Carcinoma of the lumbar vertebræ in the case previously reported.

[2] ANNALS OF SURGERY, 1898, vol. i.

CASE II.—Carcinoma of the left clavicle in a woman of fifty years, which developed five months after the removal of the left breast. In this case the patient complained of pain in left clavicle, which was fractured while turning in bed. In this case a marked tumor developed at the seat of fracture before her death, which occurred two months subsequently.

CASE III.—A woman, aged forty-five, removal of breast for carcinoma, in whom six months subsequently there were no signs of local recurrence, but the patient complained of pain in both femora. One morning while sitting in a chair both femora were fractured, apparently by muscular action. This patient before her death, which occurred two months later, developed a tumor of the right humerus and one of the left parietal bone.

CASE IV.—Woman of fifty years, who had had right breast removed for carcinoma, who, eight months after the removal of the breast, fractured her right femur while turning in bed, and developed a large spindle-shaped tumor at the seat of fracture. Death occurred several months after the appearance of the tumor of the femur.

CASE V.—Woman, aged fifty-five years, who while walking in her room felt the left leg give away under her, and she fell to the floor. When I saw her a few hours later I found a marked tumor at the middle of the left femur, mobility and crepitus were marked. Upon questioning her, she said she had for some months suffered from pain in the left femur and a painful tumor of the left breast which had never been operated upon. Upon examination of the breast I found a firm tumor involving the left breast, adherent to the skin, which presented the typical pig-skin induration. This patient died several months later of pulmonary metastasis.

The most prominent symptoms of metastatic carcinoma are localized pain, which may be dull or acute in character, and thickening of the bone at the seat of infection. The former is most common, and should direct attention to the occurrence of this affection. In this affection of bone, operative procedures offer little chance of relief, although in cases involving the spine, where pain and pressure symptoms are marked, as in the case reported by Curtis, it would seem justi-

fiable to resort to operation, if only for temporary relief of the symptoms. In cases involving the long bones, the possibility of fracture, which adds greatly to the patient's discomfort, should not be overlooked, and the patient should as far as possible be carefully guarded against the occurrence of this accident.

THYMUS GLAND TREATMENT OF CANCER.*

A PRELIMINARY REPORT WITH A PRESENTATION OF A CASE OF INOPERABLE CANCER WITH GREAT RELIEF OF SYMPTOMS.

BY FREDERICK GWYER, M.D.,

OF NEW YORK, N. Y.,

Surgeon to Bellevue Hospital.

THE case herein reported was referred to me by Dr. A. E. Isaacs of this city on April 1, 1907. The essential history of the case is as follows:

Mrs. B., aged forty-eight. Married. Noticed the first appearance of a cancer in the left breast in 1899. She was operated on by Dr. Ellsworth Eliot, Jr. A second operation was performed by Dr. Eliot in June, 1906. A recurrence seems to have taken place immediately after, and she was treated for about three months by X-rays without result.

About two or three months ago she noticed the disease had involved the supraclavicular glands on the same side. She eventually consulted Dr. Isaacs who considered it to be an inoperable case and referred the patient to me.

At her first visit, which was on April 1, 1907, I found the following conditions:

1. Pain in the shoulder region, in the arm, and in the breast region and scar, so great as to prevent sleep at night.

2. One or more glands just above the breast scar. A matted mass of glands beneath the clavicle, filling and bulging the subclavicular space.

A mass of glands above the clavicle with several isolated glands in the neck region. The supraclavicular mass was about the size of a hen's egg, matted together and painful to the touch.

Several glands in the right side of the neck and some of considerable size in the right axilla.

3. The shoulder and arm showed marked swelling extending

* Paper read and case presented at the meeting of the New York Surgical Society on Wednesday, May 8, 1907.

to the dorsum of the hand which was puffy. The patient was disinclined to move the arm from sense of weight and pain.

Treatment was begun on the date mentioned and continued until April 25, 1907. The patient within forty-eight hours reported diminished pain and ability to sleep. The swelling of the glands, shoulder and arm began to subside and she moved and used her arm more freely.

On April 27, 1907, her temperature, which had been normal until then, shot up to 102 degrees F. and continued elevated until May 4, 1907, reaching at times as high as 104 degrees F. It subsided and became normal on the date last mentioned. A peculiarity noticed was that the pulse was at no time above 90 and always of good character.

During the fever she had pain, at times intense, at the free border of the ribs on the left side, and the spleen seemed moderately enlarged. She was confined to her bed. During this time the patient was cared for by Dr. John Block, whose treatment was mainly observation. Quinine was given in doses of 20 grains a day without effect. Salol was being administered during the last days of the fever.

During the period of fever, about nine days, there was continued diminution in the size of the glands.

She has been free from fever since May 4, 1907, nearly free from pain, is slowly regaining her appetite and strength, and to-night shows, of all the different masses of glands, only two slightly enlarged above the left clavicle and two above the right. The swelling of the arm and shoulder region has disappeared. The amount of reaction is shown by her weakness and a loss of 10 pounds in weight in ten days. In verification and as additional testimony, I herewith give a letter just received from Dr. Isaacs:

NEW YORK, May 7, 1907.

Dear Doctor Gwyer:

I have seen Mrs. B—— today and report herewith the results of my examination:

The practical disappearance of the supraclavicular glands is the most notable feature, as the enlargement of and pain in these glands was the most prominent symptom when you began your treatment. You will recall that at that time they formed a visible mass, about the size of a small chicken's egg to the feel, with a more or less boggy infiltration of the adjacent tissues. This mass has practically entirely disappeared, with the small reservation I will mention later. I want to remark here the conditions on

my previous examination, while she was under your treatment and before her attack of fever. At that time, the previously existing bogginess had disappeared, the tumor itself had reduced to about half its original size, and in place of the homogeneous oval-shaped mass previously felt, there could now be appreciated three distinct enlarged glands almost separated from one another. To go back to the present condition, the small reservation I want to make as to the entire disappearance of the mass, is that there is yet to be felt on deep palpation, behind the clavicle, some small irregularities that give the impression to the palpating finger that they might be the broken down remains of some of the glands; they have not the smooth feel and globular outline usual to enlarged lymphatics.

The next feature of note is the entire disappearance of the œdema, pain and general loss of function of the arm, forearm and hand. There is now practically no difference between the two upper extremities, whereas previously the œdema, etc., were quite marked.

The character of the tissues on the anterior chest wall, above and below the scar and in the axillary space, is markedly changed. Whereas it was hard and brawny before, almost pitting on pressure, with some infraclavicular and axillary glands indistinctly palpable, and skin immovable on underlying chest wall, it is now soft and normal with no swelling and no appreciable glands.

The supraclavicular gland on the opposite side is yet palpable but decidedly smaller than it was. The woman is quite weak, I suppose as the result of her recent severe and protracted spell of fever, but she is gradually recovering her strength. There is quite some tenderness yet on pressure over the parts which had been affected, especially where there seems to be any remains of the process, as in the supraclavicular regions on both sides.

Very truly yours,

A. E. Isaacs.

It is not claimed that the patient is yet cured, but it may be fairly claimed, I think, that the cancerous process has been arrested and its clinical evidences greatly reduced. And there is ground to hope for the ultimate cure of the patient.

Treatment will not be resumed until the patient is strong enough to stand another period of autointoxication and elimination.

The treatment given in this case, and in others to be touched on, was the thymus gland, either dried and ground to powder, or as a watery extract of the nucleoproteids and other elements. The dose of the powder varied from one to four drams three or four times a day, with sodium phosphate half an ounce once a day for eliminatory purposes. Meat was

permitted sparingly, but milk, eggs, starches, sugars and some fats were allowed in the diet.

In addition to the above case I have another, of X-ray burns of the hands, in which cancer developed and was repeatedly removed, which I have treated intermittently for the last year. There has been no return of the disease, the color of the skin has become normal, its resistance to irritation increased, and the precancerous changes which were so noticeable during the previous five years have not reappeared.

Another case, from Drs. Hotchkiss and Hawkes, cancer of the penis, with recurrence in the groin, a hopeless case, had received morphine as desired; after treatment with thymus was begun, the patient was fairly free from pain and the growth showed a decided diminution before his death.

Another case, from Dr. Tilton, cancer of the larynx, with secondary involvement of the neck glands, inoperable, showed under treatment a marked diminution in size of the glands. Breathing was so bad the patient was sent in to Bellevue for immediate tracheotomy. He improved so much under thymus treatment that tracheotomy was not performed until a month later when, and owing to a streptococcus infection occurring, his trachea filled with pus and debris and he eventually succumbed. He too was fairly free from pain after medication was begun. Dr. Tilton permits me to state that he considered the reduction of the glands very remarkable.

Another case, from Dr. W. G. Thompson, cancer of the rectum, inoperable, has been under treatment for six days. Before treatment, morphine was administered for pain which was great. Since treatment was begun there has been no pain and an examination to-day by Dr. Frink my house surgeon, and myself, shows a diminution of the growth as evidenced by a larger lumen, and a slightly greater mobility of the mass. The patient feels well and sits up in bed.

Another case, from Dr. Hitzrot, adenocarcinoma of the breast, operation by Dr. Bolton, recurrence in the supraclavicular and other glands, has just been started on treatment and in four days the glands of the neck show a slight reduction and

the marked œdema of the upper extremity and which extends to the dorsum of the hand, is softer than it was. She reports that half an hour after taking each dose of thymus there is a feeling of fulness amounting to an aching pain in the affected regions; this feeling lasts from one to one and a half hours. Another symptom, one which I have observed in other cases, is that while her appetite is good, it is more easily satisfied.

Another case, from Dr. Isaacs, removal of the breast, recurrence in the supraclavicular glands, inoperable, improved under treatment while it lasted. The patient was impatient and uncontrollable and the case was under observation but a short while.

Of course I fully recognize that the treatment in these cases has been too brief to demonstrate anything except the local improvement which has taken place during it, and I mention them only to show that improvement, to illustrate certain associated features, and it is hoped as a basis for subsequent report.

I have used the dried thymus gland of the calf, and also a watery extract of the gland containing the nucleoproteids and an amylolitic enzyme. This enzyme, which is in quantity and powerful, seems not to have been discovered before, as I can find no record of it in my extensive reading. It will be taken up further in a future communication.

The glands were received fresh, fat removed, cut up and dried at a low temperature by a forced draft of air; then ground and sifted to a uniform powder. This was administered stirred in water about an hour before meals.

The watery extract may be prepared from the dried gland as follows:

To eight ounces of a solution of sodium chloride (four grains to the ounce) add a dram of the dried powder, and a little thymol. Frequently agitate for one hour. Strain and filter as rapidly as possible. After filtering twice, acetic acid 50 per cent. C.P. is added, using a 20 per cent. solution, with stirring, until a point of acidity is reached which gives good

flocculi on standing a minute or two. The precipitate is separated by filtration and redissolved in a solution of sodium carbonate (three-quarters of a grain to the ounce of water), using about one and a half ounces of the solution. This solution is filtered twice, and to it is added acetic acid to acidity and good precipitation.

The precipitate is again separated by filtration and redissolved in a solution of sodium carbonate (one grain to the ounce of water), using two drams of the solutions and adding thymol. This final solution is filtered three times or more and with a crystal of thymol will keep good in a refrigerator for an unknown time. Each dram of the solution represents the products from half a dram of the dried gland. The process for the production of an ounce of the extract takes about six hours. Distilled water should be used and the solutions kept cool during manipulation.

This solution I have given by mouth and by hypodermic in doses up to one dram. Hypodermically it shows no tendency to cause local irritation.

As this is merely a preliminary paper, it is not my desire at this time to give my theory as to the cause of cancer, nor why I consider the thymus gland should be supposed to be effective in the treatment of cancer. The theoretical side of the question and my experimental work will be given in a future paper.

I would keep to the practical side and may say that I have found the use of the thymus gland in cancer will produce the following results:

1. Diminish or eliminate pain.
2. Diminish the size of the growth.
3. Its use is followed by better digestion, by more regular action of the bowels, and improvement of the general condition as evidenced by a clearer skin and eyes, greater energy, and a general sense of health and well being.

I have some reason to hope that the use of the thymus gland will have a wider range of action than in the treatment of cancer and will include sarcoma and some other new

growths, and some diseases due to faulty metabolism or senility.

The only use of the thymus gland in the treatment of disease of which I can find any record is, its use first by Mikulicz with some success in the treatment of goitre.

Too much care cannot be used in the selection of the thymus glands, and in the preparation of the powder and extract; at a later date I will give further particulars on this subject.

The dosage is still experimental and a great deal of care must be exercised in its administration, for I have reason to believe that it is a very powerful agent. I would advise the greatest caution in its use and at present can only give general directions to that end.

It would seem that the amount of action and reaction depends on the amount of diseased tissue and its situation.

I have taken as large doses for as long a time as I have ever given them, with nothing but good results. This might represent the non-cancerous or slightly cancerous type.

In the case shown, the diseased tissues were in quantity and without ulceration, and all elimination was of necessity through the emunctories. The dose in such a case should be small and the patient carefully watched. It is possible that once the disintegration is started, it may get beyond our control and I can imagine a case with such an amount of cancerous tissue to be eliminated, that under treatment an autointoxication of such severity might ensue as to prove fatal.

I think it necessary to utter this warning because in the two fatal cases, Hotchkiss's and Tilton's, with the rapid reduction of the tumor coincided a rapid loss of strength and an early death which suggested a suddenly increased toxæmia.

Cases of surface cancer and especially those which are ulcerating seem to stand more medication with greater safety.

It is very necessary that, during treatment, every help be given towards elimination: The bowels kept slightly loose by phosphate of soda, the kidneys active by plenty of fluids, and the skin active by frequent baths.

I would still advise operation in all operable cases. Also in so-called inoperable cases, for the removal of as much diseased tissue as possible, so that there will be a minimum amount to be absorbed and eliminated. Such a course will not only be safer but will I think shorten treatment and give greater chance of success.

I think it will be found that the rapidity of cure will be in direct proportion to the rapidity of development. Skin cancer and others of slow growth will be slow of cure. The more rapidly growing cancers will be more rapidly cured but with correspondingly greater reactions and dangers during treatment.

I think the treatment offers much to those with small cancers, to those with moderate amount of cancer who absolutely refuse operation, and to many of those with cancers classed at present as inoperable and incurable and which have not been helped by other means. Every case treated so far has been considered as beyond operation and beyond hope of cure.

It is right that I should be somewhat enthusiastic regarding this method of treatment, but I would urge the importance of slow judgment as to its merits and only ask that it be tried and that it be not condemned because it fails to cure every case, and particularly those cases in which the disease is very extensive, and the vitality very low; such cases in short as are likely to be the majority of those first offered for treatment because of the impracticability of subjecting them to operation.

I anticipate that many cases will show improvement but eventually die; but with increased experience with the treatment we can, I think, prognose with some degree of certainty.

No fee has been charged the patients treated and they have understood that the result of treatment was problematic.

As the preparations are not yet on the market,[1] and the

[1] Upon inquiry I find that there are two firms who have had preparations of the thymus gland in the market for some time. I have not tried these preparations.

work is still experimental, I would be glad, within the limits of my time, purse, and facilities, to receive and treat any cases which members of this society are good enough to send me; the proviso being that the patients accept the treatment and its results and report back to those sending them, at stated intervals.

NOTE.—Since the above paper was read before the New York Surgical Society, criticisms have been made that its publication would be premature, that it would be inferred that I presented a case as cured by thymus treatment, and that I presented the treatment as a positive cure for cancer.

If the paper is read carefully I think it will be found to contain no such claims. I do not claim to have cured a case as yet, nor do I as yet know that the thymus treatment will cure cancer.

The paper is a preliminary report of my work with the thymus gland; it gives the actual results so far obtained, and I consider my presentation of it warranted. My object is to bring the subject to notice and to offer it as an invitation to further investigation by clinicians and laboratory workers.

PERITONEAL TUBERCULOSIS.*

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In 1889 I discovered accidentally that simple laparotomy might effect a cure in cases of tubercular peritonitis. I had a patient who presented an obscure abdominal condition and for purposes of diagnosis an exploratory laparotomy was performed. On opening the abdomen it was discovered that the patient suffered from tubercular peritonitis, principally involving the mesentery and the mesenteric glands. One gland was removed for microscopic examination and the abdomen was closed without further surgical interference. The case was regarded as hopeless, but from the time of operation the patient made a progressive and rapid improvement and became apparently completely well. He remained so for about two years, when the disease started afresh.

In a paper, entitled "The Influence of Laparotomy on Tuberculosis of the Peritoneum,"[1] read before the New York Surgical Society, in November, 1890, this case was reported and I also reviewed all the preceding literature on the subject, and set forth the various theories concerning this remarkable phenomenon. At that time there was no theory which seemed to explain the fact that laparotomy does effect a cure in a large percentage of cases. Up to that time there had been many cases recorded, but with few exceptions the operations had never been done for the purpose of affecting a cure of tubercular peritonitis, but they had been performed for the purpose of diagnosis or else under the mistaken idea that the surgeon was operating upon some other condition.

In 1890 Koenig had tabulated a set of 131 operations in

* Read before the New York Surgical Society, March 13, 1907.

this condition [2] and to Koenig belongs the credit of first advocating simple laparotomy as the proper surgical procedure in these cases. My paper, read in 1890, embraced the following conclusions:

1. That the danger of the operation is very slight; at present the death rate is but 3 per cent.

2. That sepsis is not so likely to occur in these peritonæa as in laparotomy in healthy ones, on account of the pathological changes which have taken place in the membranes.

3. That tubercular infection of the wound does not occur.

4. That disinfections are useless and that drainage should not be used, as it is likely to result in a permanent sinus.

5. That in unsuccessful cases the operation at best does no harm. Most of the patients who have died at a time remote from the operation, have succumbed to general tuberculosis or to tuberculosis of some other organ.

6. That established, not advanced pulmonary tuberculosis, is an indication for and not against the operation; for the improvement gained enables the patient to better resist the phthisis, and if this latter is but incipient, recovery may take place.

7. That laparotomy is the proper form of treatment for these cases. In some unknown way it exerts a most beneficial influence upon the disease, resulting in cure in a large proportion of cases and in a marked improvement in nearly all.

Nine years later, I carefully reviewed the subject and found that an immense amount of work had been done in this line, surgeons having eagerly taken up the procedure, but, notwithstanding the mass of clinical reports, practically nothing new had been added. There was still no satisfactory explanation of the phenomenon and nothing new of importance had been proposed in the way of treatment. Laparotomy was considered as the curative procedure by most surgeons and clinicians and as the preferable mode of treatment; but by the end of that decade a reaction set in, many becoming antagonistic to the surgical treatment of this malady, some claiming that more patients would get well under medical treatment than

after operation. Some went so far as to claim that laparotomy is never indicated in cases of tubercular peritonitis. One of the most notable publications in favor of the medical treatment and antagonistic to the surgical was that of Borchgrewink,[3] in 1891.

In the same year Fenger [4] wrote a review of the subject, quoting from Teleky,[5] Frank,[6] Bottomley,[7] and Borchgrewink.[8]

Fenger gave the views of the advocates and opponents of laparotomy and endeavored to reach some definite conclusions based upon a study of the literature and personal experience. His views seemed to accord with those of Borchgrewink, whom he quoted as follows: "That laparotomy is well tolerated in strong patients in whom fever is absent and their condition of nutrition good, speaks for a spontaneous disappearance of the tubercular process. Laparotomy, however, in patients with fever, when the tuberculosis has a progressive character, must diminish what slight power of resistance such a patient has remaining. This power of resistance may thus yield and death follow; or it may, by concurrence of fortunate circumstances, rebound and the patient recover in spite of the operation. That form of peritoneal tuberculosis which exists without fever, or with only slight fever, runs in itself a favorable course. In such cases laparotomy is unnecessary. In progressive tuberculosis the operation is dangerous and should be abandoned."

Borchgrewink based his conclusions on a study of 40 cases. Of 22 operative cases, 8 were light, 6 moderately severe and 8 severe. Fourteen, or 63.6 per cent., recovered, and 8, or 36.4 per cent., died. Of 17 patients treated without operation, 14, or 82 per cent., recovered and remained well for two or three years.

The publications of Borchgrewink and Fenger excited renewed interest in this subject and there were many important contributions resulting therefrom. The opinions and conclusions arrived at vary so much that there is an unfortunate lack of unanimity, and it is the object of this paper to place in review numerous contributions on the subject and to attempt

to formulate a consensus of opinion which may be a guide to the proper treatment of tubercular peritonitis.

Elestratov [9] reviewed the statistics of a number of writers and found that 31.6 per cent. of 136 cases recovered under medical treatment and that 78.3 per cent. of 240 cases recovered after operation. He judged that the tubercular peritonitis which runs a stationary or chronic course, with little fever and with little or no ascites and but slight disturbance of nutrition, is capable of spontaneous and permanent recovery. On the other hand, when the original tubercular foci can be demonstrated in the mesenteric glands, intestines, or uterine appendages, he thinks that surgical intervention is urgently called for.

Shattuck [10] analyzed the histories of 98 cases of tubercular peritonitis treated in the medical and surgical wards of Massachusetts Hospital from 1889 to 1900. Of 46 cases treated without operation, 7 died in the hospital, while of 52 surgical cases, 6 died in the hospital. The mortality at the time of discharge from the hospital was 13.2 per cent., while the mortality of the same series of cases, after a lapse of from two to eleven years, was 47.3 per cent. The ultimate mortality under medical treatment was 68 per cent. and under surgical treatment 37.5 per cent.

The therapeutic lessons derived from this analysis are as follows:

1. Tubercular peritonitis may be followed by apparently complete recovery, even if complicated by tuberculosis elsewhere, either under (*a*) purely medical treatment; (*b*) tapping; (*c*) incision.

2. As in other forms of internal tuberculosis, the best obtainable hygienic surroundings are all-important, consequently no patient should be kept in the hospital longer than is necessary, especially if more and better air can be secured outside, with proper care and food.

3. We are warranted in trying medical treatment for a time, especially under first-rate hygienic conditions, tapping the abdomen if there is sufficient fluid to cause discomfort.

4. If the patient under a month or six weeks of medical

treatment fails to improve, or in even less time, if he seems to be losing ground, surgical treatment should be advised.

Miles F. Porter [11] presented a paper on the study of the literature of the subject and a personal experience in the operative treatment of 12 cases. He does not ascribe recoveries to the operation alone, but believes the operation to have a decided curative effect. In his opinion, the ascitic form yields the best results and the ulcerating or caseating the worst. Porter suggests the exposure of the open peritoneal cavity to the actinic and X-rays.

Veit [12] reviewed the literature and expressed the view that tubercular peritonitis may get well spontaneously, even if not very frequently. He ascribes failure after operation in many instances to tuberculosis of other organs. He advises laparotomy without drainage in acute cases as soon as difficulties arise, and in chronic cases in which spontaneous recovery does not take place after a reasonable observation.

Thœnes [13] reported 33 operative cases from Kümmel's clinic. Of 16 cases with ascites, 3 died, or 18.7 per cent.; 10 were discharged cured. (Three of these 10 were later operated upon for some other condition four, eight and eleven years after the original laparotomy, when no trace of tuberculosis was found.) Of the 3 cases remaining in the hospital, 2 recovered subsequently. Of 17 cases of the dry variety, 12 or 70.6 per cent., died, 3 were cured, and 2 improved. The ascitic variety shows the best results; laparotomy in the dry variety proved disastrous.

In a later article,[14] Thœnes analyzed 80 cases from the Eppendorf Hospital and the surgical clinic of Göttingen. These cases were followed for some time after they left the hospital. His investigations established the fact that while a number of cases will recover under medical treatment, or without any treatment at all, there are many in which internal medication fails and subsequent laparotomy proves of decided value. He regards advanced complications of the lungs, larynx and intestines, as well as septic conditions, contraindications to operation. He believes that procedures such as the removal

of primary foci are only permissible when they can be done without the breaking up of dense adhesions. He compared the medical and surgical results in a collection of cases and found 48 per cent. of lasting cures in 82 cases treated medically, and 54 per cent. of lasting cures in 244 cases treated surgically. This would indicate that the results after medical treatment are not so good as those after operation and that one should resort to laparotomy without continuing medical treatment more than a few weeks, unless there should be marked benefit shown.

Schwarz [15] reported 30 cases treated by laparotomy, of which 21, or 70 per cent., were cured. One case was well ten years after operation; 4 seven years after, 4 five years, and 7 three years after. None of the fatal cases died as the result of operation. In 4 cases he was able to demonstrate a cure at subsequent operations for some other conditions.

Dœrfler [16] reported 32 cases. He employs conservative treatment as long as the amount of exudate does not threaten life, as long as there is but slight fever and as long as the general condition remains fair. He operates if there be hectic fever, if ascites increases, or if the patient is losing strength. He advises early operation in acute cases, associated with high or persistent fever. He tries aspiration first; if that fails, he performs laparotomy. He is in favor of drainage after laparotomy. He considers the ulcerating form hopeless.

Friedlander [17] cannot believe that so serious and chronic a process as tuberculosis can be influenced by so short an intervention as laparotomy. He used statistics to prove that laparotomy favors the occurrence of fæcal fistulæ. He cautions against breaking up of adhesions, but advocates laparotomy in the presence of palpable undulating masses and uncysted collections of pus and stagnating secretions.

Fairchild [18] advises laparotomy where an intra-abdominal focus is suspected or diagnosticated. In the ascitic variety, he recommends laparotomy if the hygienic treatment has failed. In the fibrous form, he advocates the same. He considers laparotomy useless in the acute form with ascites and

high fever. Where there is much matting together of the intestines, he thinks laparotomy will be unsuccessful.

Guthrie [19] reported 41 cases. Fourteen were operated on, with 7 deaths; 27 were treated medicinally, with only 4 deaths. He recommends tapping in chronic cases with ascites. He believes laparotomy beneficial only because it does away with the fluid.

Pagenstecher [20] advocates operation in the chronic stage and in those cases in which the uterine adnexa are the primary foci. He does not believe in operation in the dry variety and in the encapsulated form of the disease.

Rotch [21] wrote a very important article with an analytical study of the cases which had occurred in the Children's and Infants' Hospital of Boston, Mass., during the eighteen years preceding. Rotch is in favor of operation. He feels that operation should not be done during the first year of infancy because then tubercular peritonitis is usually a part of a general miliary tuberculosis. He feels that the ascites shows a less advanced form and a more active process, which is favorable from a prognostic standpoint. He considers the fibrous form less favorable, especially if ascites is absent. In the ulcerative, caseous form, it is usually found that there is tuberculosis elsewhere, especially in the bronchial lymph glands and lungs, which acts as the primary focus of infection; hence these cases are not benefited by laparotomy. He would advise laparotomy in the primary form, even if the peritonitis is secondary to a mesenteric gland, which should be removed.

The following passages are well worthy of quotation:

"There have, of course, been cases of tubercular peritonitis which have recovered spontaneously, but the fact that this result can occur does not indicate, as has been suggested by some writers, that we should not operate, but should wait and see whether such spontaneous recovery would take place.

"The danger of localized tubercular peritonitis, which we know can get well, becoming disseminated and thus producing a general tuberculosis or a localized tuberculosis of the lung or brain, is undoubtedly a great one, and knowing that

if this dissemination does take place the child will in all probability die, it seems much more reasonable to operate before such dissemination has taken place, than to wait until it is too late. It is also well known that, first, in individual cases of localized tuberculosis, we are unable to say whether such cases will recover spontaneously or will become a general tuberculosis; and second, that an exploratory laparotomy, when performed by an expert, is known to be of little danger, especially in the earlier stages of the disease, when the child has not yet become markedly reduced in strength and vitality. Is is not better, then, to give the child the benefit of the chance, and when we are reasonably sure that tubercular peritonitis is present in a child over one year of age, and when there are no evident signs of tuberculosis elsewhere, or possibly only in the mesenteric lymph-nodes, is it not better to make an exploratory laparotomy at once?"

Zesas [22] reviewed a long list of articles on the subject and reported two surgical cases of his own. He does not believe in waiting for spontaneous recovery, with all its uncertainties.

Ochsner [23] advocates drainage for laparotomy in the ascitic form. He cautions against breaking up adhesions and against rough manipulation of the tissues, particularly of the intestines. In the absence of the ascites, the diseased tissues may be removed, if the section is made through healthy tissue. He tabulated 32 cases treated in one hospital and later he recorded 8 more cases. From his experience, he drew the following conclusions:

1. In the absence of fluid, the diseased tissues can be removed with safety if the section is made in healthy tissues.

2. In the presence of ascites, remove it thoroughly and drain.

3. Avoid injuries of the peritoneum (abrasions).

4. Adhesions should not be disturbed.

5. The more gentle the handling of tissue, the better the results.

6. The diseased pelvic organs tolerate handling better than the intestines.

Eichberg [24] claims the percentage of recoveries for all ages without operation to be greater than with operation. He recognized the fact that cases with ascites form an exception, but he holds that these are cases which tend to spontaneous cure. In the discussion which followed, so eminent a clinician as Tyson of Philadelphia said, "To treat it medically is to temporize; in other words, that there is but one treatment that is likely to lead to satisfactory results and that is surgical."

Halstead of Chicago [25] advocated laparotomy in a majority of cases. Most of the cases cured by laparotomy he claims to be of the acute miliary form.

Köppen [26] [27] believes in operation when the exudate becomes troublesome and the general condition does not radically improve. He advises removal of the exudate by laparotomy and washing out the abdomen with a saline solution.

H. W. Freund [28] believes in conservative treatment for mild cases, but in surgical treatment for severe cases. He argued against the skepticism of Borchgrewink, which he said experience has contradicted.

Schraum [29] reported 45 cases in children. The operated cases showed the best result. He considers the prognosis best in the exudate form.

Murphy [30] in his classic article described four varieties of tubercular peritonitis, *i.e.*,

1. Disseminated, exudative, miliary, non-confluent, serous (ascitic) variety.

2. Nodular, ulcerative, or perforative (the least frequent variety).

3. Adhesive, fibroplastic, cystic, partition or obliterative variety.

4. Suppurative, circumscribed, or general mixed infection.

He recognizes four essential features in the treatment of peritoneal tuberculosis: First, to remove or shut off the source of supply of new tubercular debris; second, to remove the products of the infective process from the peritoneum; third, to increase the tissue proliferation for the encapsulation of the foci already present; fourth, to avoid mixed infection. He

says that all treatments which have availed have succeeded on these lines.

Murphy believes surgery to be a benefit in the disseminated serous, and in the nodular, ulcerating varieties, but in the adhesive variety, surgery is of little avail.

He lays special stress on the necessity of removing or shutting off from communication the original focus of the disease, as the fallopian tubes, vermiform appendix, etc.

McMurtry [31] [32] thinks in those cases of marked acuteness, characterized by high temperature and rapid pulse, both with and without effusion, operation generally fails to arrest the active progress of the disease. Nevertheless, the hopeless character under any other form of treatment and the harmlessness of method under aseptic precautions, justifies, he believes, the operation in every case, especially if there is effusion and diagnosis is not absolutely positive. Thorough removal of the invaded structures is usually followed by permanent cure.

L. Miserochi [33] reported 14 cases cured by medical treatment alone. He had more cases, but mentioned only those in which the interval had been long enough to speak of a permanent cure. In 8 of his cases there was ascites. By the use of iodine internally and externally the ascites was absorbed and the palpated nodules retrogressed.

Charles H. Mayo,[34] and abstract,[35] removes the original lesion, leaving the peritoneal condition to cure itself. He closes the abdomen without drainage. He believes cases should be selected; in some patients the condition is such as to render operation extremely hazardous, as well as futile. In males the incision is made over the vermiform appendix; in women it is so arranged as to explore the pelvis. He reported 59 operations by the older method,—*i.e.*, without removing the original focus. Of these there were 42 cured, 15 improved, and 2 died. Of 58 operations for removal of tubercular tubes, there were 56 recoveries and 2 deaths. Of 27 cases of tubercular appendicitis (appendectomies) there was no death.

Schömann [36] formerly did laparotomy in selected cases. Now he believes he gets better results by puncture and injection

of 5 per cent. glycerine emulsion of iodoform. He treated 7 cases and regarded them all as cured in the course of from three to ten weeks' treatment. Some of the patients required repeated injections.

Wm. J. Mayo [37] in his article "Surgical Tuberculosis in the Abdominal Cavity with Special Reference to Tubercular Peritonitis," reviewed post-mortem statistics, viz.: "In St. Mary's Hospital, Rochester, Minn., from October 1, 1894, to October 1, 1904, a period of ten years, there had been 6,408 abdominal operations performed. Of this number, 5,687 were intraperitoneal, and 184, or about 3 per cent., were for some variety of tuberculosis. Localized intestinal tuberculosis occurred 21 times; 13 cases were primary and 8 were uncertain."

He discussed the various forms of intestinal tuberculosis: "Tuberculous disease of the appendix we have found as a localized process 29 times, with no deaths, in 1,888 operations for appendicitis." . . . "Tuberculosis was found localized in the Fallopian tubes 44 times without tubercular peritonitis, the tubal lesions being securely walled off." . . . "In other words, between the ages of twenty and forty years, tubercular peritonitis is certainly very much more frequent in females and, so far as direct sources of infection are concerned, the tube is the one which may explain the difference in frequency. There were *89 cases of tubercular peritonitis, with 3 deaths.*"

"The clinic of this hospital is drawn largely from a fixed agricultural community and the majority of cases operated on who left the hospital improved, but failed to stay well, returned for further treatment. A considerable percentage did not maintain the improvement, and, in the course of years, patient after patient would return with relapse of the peritoneal condition or some other form of tuberculous infection. Some returned for further operation as many as four and five times. It became evident that, in a considerable percentage of cases there was some source of reinfection of the peritoneum after apparent cure."

" Having under observation a small number of patients in whom simple laparotomy had failed to permanently cure tubercular peritonitis, we began to do a radical operation, performing hysterectomy with removal of ovaries and tubes." He found this to be too radical because the uterus and ovaries showed no disease.

" By patience and care, we found it possible to enucleate tuberculous tubes in 26 cases of tuberculosis of the peritoneum. In practically all these cases the peritoneal involvement was the greatest in extent near the seat of local infection; this has been generally noted and heretofore ascribed to gravity. It is more likely to be due to proximity to the seat of infection."

" In many instances the region of the greatest distribution of tubercular peritoneal nodules could be shown near the appendix." " While simple abdominal incision and drainage has failed to cure all the cases, it did cure many and usually gave relief for a time, and if re-infection could be prevented, the cure might be expected to be permanent in a much larger number."

" Can we prevent relapse? Certainly we can in many instances. Of the 26 radical tubal operations we have made on cases of tuberculous peritonitis, 25 recovered; of these, 7 had been operated on by simple laparotomy from one to four times previously. In not a single patient as yet has another operation become necessary, and, as contrasted clinically with a preceding group of equal number, the favorable results are most striking."

" In tubercular peritonitis in women, we evacuate the fluid and then place the patient in the Trendelenberg position, packing off the general abdominal cavity in the usual manner. The pelvic organs, appendix and cæcum are examined. If the Fallopian tubes, appendix and cæcum are diseased they are removed." No drainage. In men, the incision is placed to the right of the median line over the appendix."

" The treatment of tubercular peritonitis should embrace not only the treatment of the peritonitis which is symptomatic, but the removal of the source of infection which, in the majority

of cases, will be found in the Fallopian tubes, appendix or intestine."

Göschel [38] in his experience found that about 23 per cent. of ascitic cases and only 10 per cent. of cases of adhesions were cured by operation; that children recovered spontaneously in about one-third of the milder uncomplicated cases. He advises that "laparotomy always helps, sometimes cures, and never harms."

F. F. Lawrence [39] advocates operation; he believes in drainage and thinks that the primary focus should be removed.

S. Lloyd [40] reported 21 cases. His experience and opinion formed from literature makes him feel that operation gives the best chance to the patient.

G. Faludi [41] believes in laparotomy in the ulcero-caseous and fibro-adhesive varieties in children, and in the ascitic form, after hygienic and dietetic treatment have been tried without success; or in cases where it cannot be tried he believes the serious tubercular affection of other organs to be a contra-indication.

D. MaCartney [42] advocates laparotomy. In cases of doubt he insists on exploratory operation.

T. Guthrie [43] believes in laparotomy. In the ascitic form, he thinks aspiration may be of value in some cases. In the caseous and ulcerative form, operation is contraindicated and frequently in the adhesive form.

John B. Boucher [44] considered the etiology, pathology, diagnosis and treatment of the disease, and quoted Murphy as follows:

"The surgical treatment of tuberculosis of the peritoneum involves the following propositions: 1. To remove or shut off the source of supply to the peritoneum of new tuberculous debris. 2. To remove the products of the infective process from the peritoneum. 3. To increase the tissue proliferation for the encapsulation of the foci already present. 4. And to avoid mixed infection. Serous variety gives the best results. Dry and ulcerative variety is followed by high mortality and little is accomplished by surgery. In the localized suppurative

form, the operative result is quite favorable, while in the suppurative multilocular cystic variety but few recover."

The literature reviewed above practically embraces the reports of all the work which has been done in this field of medicine during the period of modern surgery. There has been a vast amount of clinical work and scientific research, but some phases of the question stand exactly as they did when I wrote my first paper on this subject in 1889. To-day it is as true as ever that laparotomy *per se* will affect a cure in certain cases of tubercular peritonitis; that is to say, this cure is brought about by merely opening and closing the abdominal wall; and to-day we are as ignorant of the reason why this remarkable phenomenon takes place as we were when it was first discovered and demonstrated. On the other hand, much has been learned in the last ten years of the rationale of the treatment of tubercular peritonitis. For instance, we have learned that operations should not be undertaken during the first year of infancy; we have learned that surgery offers but little hope in the adhesive variety of the disease; we have learned that the serous variety offers the best prognosis under the various forms of treatment and that the surgical treatment of this variety offers the best results obtainable in this disease, but the most important lesson we have learned is that the scientific operation of to-day is the one which has for its foundation the removal of the original focus of the disease, as tubercular Fallopian tubes, vermiform appendix, mesenteric gland, etc. Perhaps William Mayo has made this clearer than any of the contributors to this subject when he detailed a number of cases in which repeated operations had been done under the older method, recurrence taking place and finally laparotomies had been performed, with removal of the original foci, and the patients have remained well.

The skepticism toward the surgical treatment of this disease, as particularly championed by Borchgrewink, has not prevailed. Statistics have proved that cases treated by operation have done better than similar series of cases treated without operation. On the other hand, much has been added to our

knowledge of the disease by the writings and thoughts of these men. We realize the importance of hygienic treatment; we realize the impropriety of operating on all cases of tubercular peritonitis; we realize that laparotomy should not be performed when the peritoneal trouble is only one phase of a more or less general tuberculosis.

Before closing, I wish to thank my colleague, Dr. Henry Roth, for he rendered me the greatest assistance in compiling and analyzing the voluminous literature on this subject.

If the next few years shall add as much to our knowledge of this subject as was learned during the last decade, it will certainly be a great blessing to humanity, for we may look forward to a constant improvement in the results of treatment in this serious malady.

REFERENCES.

[1] N. Y. Med. Journal, Feb. 7, 1891.
[2] Zentralbl. f. Chir., 1890, No. 35.
[3] Bibliothecq. Medica. Abtheil. E. Chir., H. 4, Stuttgart, 1901.
[4] ANNALS OF SURGERY, Dec. 1901.
[5] Zentralbl. f. die Grenzgebiete der Med. und Chir., B. 2, 1899, Nos. 8-9.
[6] Mittheilungen aus der Grenzgebiete der Med. und Chir., 1900, B. 6, H. 1 and 2.
[7] Boston City Hospital Reports, 1900, page 118.
[8] Biblothecq. Medica. Abtheil. E. Chir., H. 4, Stuttgart, 1901.
[9] Journal American Medical Ass'n, Jan. 11, 1902.
[10] Amer. Journal of the Med. Sciences, July, 1902.
[11] Journal American Med. Ass'n, Sept. 13, 1902.
[12] Monat. f. Geburtshilfe und Gynecol., B. xvi, 1902.
[13] Zentralbl. f. Chir., 1902.
[14] Deutsche Zeitschrift f. Chir., B. lxx. 505.
[15] Zentralbl. f. Chir., 1903, No. 209.
[16] Zentralbl. f. Chir., 1903, No. 535.
[17] Archiv f. klin. Chir., B. lxx, No. 1.
[18] Phila. Med. Journal, April 18, 1903.
[19] Archives of Pediatrics, April, 1903.
[20] Deutsche Zeitschrift f. Chir., B. lxvii.
[21] Journal Amer. Med. Ass'n, Jan. 10, 1903.
[22] Zentralbl. f. d. Grenzgebiete d. Med. und Chir., B. vi, 1903, No. 13.
[23] Annals of Gynecol. and Pediatrics, Sept., 1903.
[24] Journal Amer. Med. Ass'n, Oct. 3, 1903.
[25] American Medicine, Jan. 31, 1903.
[26] Langenbeck's Archiv, 1903, B. lxvix, H. 4.
[27] Zentralbl. f. Chir., 1903.

[28] Beiträge zu Geburtshilfe und Gynecol., 1903, B. vii, H. 3.
[29] Wien. Med. Wochenschrift, 1903, Nos. 8 and 9.
[30] Amer. Journal of Obstet. and Diseases of Women and Children, vol. xlviii, Dec. 1903, and vol. xlvix, Feb., 1904.
[31] Annals of Gynecol. and Pediatrics, Feb., 1904.
[32] Journal Amer. Med. Ass'n, Feb. 27, 1904.
[33] Abstract Journal Amer. Med. Ass'n, April 30, 1904.
[34] Dominion Med. Monthly, Oct., 1904.
[35] Abstract Journal Amer. Med. Ass'n, Nov. 12, 1904.
[36] Zentralbl. f. Chir., 1904, page 1409.
[37] Journal Amer. Med. Ass'n, April 15, 1905, page 1157.
[38] Deutches Archiv f. klin. Med., vol. lxxxiv, Nos. 1-4.
[39] Surg., Gyn. and Obstet., 1905, vol. i, 443.
[40] N. Y. Med. Journal, 1905, vol. lxxxii, page 885.
[41] Jahrbuch f. Kinderheilkunde, vol. lxii, No. 3.
[42] Glasgow Med. Journal, May, 1906.
[43] The Practitioner, June, 1906.
[44] Medical Record, Sept. 22, 1906, page 450.

ACUTE DIFFUSE GONORRHŒAL PERITONITIS.*

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SINCE the discovery of the gonococcus by Neisser in 1879 and its isolation by Bumm in 1885, it has become known as one of the most important of the pathogenic bacteria. From Cushing I quote the following: "Few organisms, not even the bacillus typhosus, rival it in the number of suppurative sequelæ which may follow a primary infection. Its occurrence in the conjunctivæ, and in the iris, the bones,[1] the joints, bursæ and tendon sheaths, its occasional demonstration as the cause of endocarditis and pericarditis, pleuritis and phlebitis and the recent observations from the blood, show that its possibilities for metastatic complications are as numerous as are those arising from the spread of infection by direct continuity of surfaces."

In 1886 Saenger reported two cases of puerperal peritonitis which on account of the striking clinical evidence may be regarded as those of gonococcal origin. His cases cited were two multipara infected with gonorrhœa by their husbands —one nine and the other twenty-one days after delivery.

In the discussion which followed the report of the cases, in the absence of bacteriological proof Bumm was inclined to doubt the gonorrhœal cause of the peritoneal inflammation, and asserted that the gonococcus could live only in the superficial layers of mucous membrane. As a proof of his assertion he stated that he had many times attempted to produce suppuration by injecting subcutaneously cultures of gonococci, but had as yet failed in every instance to produce an abscess.

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* Read before the Metropolitan Medical Society, Feb. 26, 1907.

[1] Cupler, R. C.: Gonorrhœal Osteomyelitis, ANNALS OF SURGERY January, 1907.

Kaltenbach was inclined to disagree with Bumm, and mentioned the formation of the urethral stricture as a reasonable proof that the gonococcus extended its exploits deeper than the mucous membrane.

During that year and the two following years, cases of peritonitis of gonorrhœal origin were reported by Loven, Hatfield, Huber, Penrose and Stevens. All these occurred in children infected with gonorrhœal vulvo-vaginitis, and are not conclusive owing to the lack of demonstrating the gonococcus in the peritoneal cavity.

More convincing, however, is the case reported by E. Ceppi,—that of a woman twenty-nine years of age, who had previously been healthy, with the exception of having had a vaginal discharge for one year. She was suddenly taken sick with chills, fever, abdominal tenderness and distention, and was vomiting bile. Laparotomy was performed, and several abscesses were opened. These and the cervical canal showed presence of the gonococcus.

In 1891, at the meeting of the German Gynæcological Society in Bonn, Bumm emphasized his views more than ever and vehemently denied the possibility of the gonococcus existing in any other tissue excepting the mucous membrane.

At this same meeting, Wertheim presented his report of interesting, painstaking and conclusive experiments undertaken and conducted by himself, the results of which proved conclusively that the gonococcus alone, without the presence of other pyogenic bacteria, could produce suppuration in a serous cavity like the peritoneum.

He had injected gonococci with their culture media into the peritoneum of mice, rats, guinea pigs, rabbits and dogs, and produced purulent peritonitis which would reach its acme in about three days. All the animals experimented upon recovered, and he demonstrated the presence of the gonococci in the peritoneum, in the lymphatics and in the superficial muscular layers and their sheaths.

Wertheim noted that the peritonitis produced by the gonococcus was accompanied by an appreciable greater exudate than

that produced by other organisms, and concluded that in view of the susceptibility that the human being has for gonorrhœa, and in view of the results of his experiments on animals less susceptible to this infection, he had proven indubitably the possibility of its existence in the human being.

A few months later, he was able to further substantiate his conclusions by a female patient, age twenty-five, whom he was called to operate upon. The patient was a nullipara, and was suffering with pelvic pains and a leucorrhœa for three years. She was admitted for operation with symptoms of acute peritonitis. Laparotomy revealed pus discharging from the right tube. Cultures taken from peritoneal exudate showed gonococci.

The original assertions of Bumm were now proven as untenable.

Subsequently several cases are found to be reported in the literature of this subject. That gonorrhœal peritonitis can exist in the male is shown by cases reported by Challan, Mermet, McCosh, Van Zeisel, Horwitz, and Jadahsson.

In 1895, L. Frank published what might be considered the first case of gonococcal peritonitis, with bacteriological proof, as such published in this country. He had operated upon a prostitute seventeen years of age for acute pyosalpinx. During the operation the right tube had ruptured and soiled the peritoneum. In spite of the employment of irrigation and drainage, she developed a septic peritonitis within twenty-four hours, and died two days later. Cultures taken from the peritoneal cavity during the autopsy showed only gonococci.

Of the cases reported none are fortified by more convincing bacteriological proof than two cases reported by Harvey W. Cushing in 1899. He had operated upon two females, respectively twenty-five and eighteen years of age, at the Johns Hopkins Hospital, for peritonitis, and in the first obtained smears from the peritoneal exudate, showing gonococci, and from the second he also obtained gonococci in pure culture.

The writer should like to narrate here the report of a similar case operated upon by him in August, 1906:

R. J., age seven and a half years, school girl, was admitted to Beth Israel Hospital August 22, with history as follows:

Previous history negative.

Present History.—One week ago mother noticed that child was chafed about the genitals and that she had a vaginal discharge. The family physician, Dr. J. Rosenblueth, was consulted, and he, after instructing the mother how to prevent infection of the other children in the family, prescribed douches of a weak permanganate solution. Three days later the child suddenly became feverish and complained of being ill. Her temperature was 102½, pulse 140. She complained of no pain, and there was no abdominal tenderness. An enema was administered and was followed by a movement. The douches were now discontinued. Twelve hours later vomiting set in. The temperature and pulse remained about the same, the tongue was coated, and she complained of pain in the epigastrium. There was absence of tenderness and rigidity.

Three doses of calomel, ⅛ grain each, were followed by vomiting. The following morning the child had several loose passages and had some pain in the left iliac region. Vomiting still persisting. The following, or the fourth day of illness, she felt better, and attempted to get up and about. At midnight vomiting set in again. Enemata were again administered but were not retained. The abdomen became distended and very hard. With increasing severity of the symptoms and the abdominal tenderness of the left side more marked, her condition became alarming and the following morning she was sent to the hospital. About this time it was noticed that the vaginal discharge had diminished.

Examination upon Admission.—General appearance is that of a very sick anæmic little girl. Temperature 100.6, respiration 34 and thoracic in character, pulse 130. Abdomen uniformly distended and tympanitic, but the rigidity of the recti was not marked. General abdominal tenderness more marked in umbilical and splenic regions. No tumor could be made out nor increase in tenderness in the right iliac region.

There was a clear picture of general peritonitis, and it did not appear to me as one of appendicitis nor intussusception. An examination of the vulva revealed a purulent discharge which was immediately examined and found to contain gonococci.

Blood Examination.—Leukocytosis, 12,800; polynuclear, 62 per cent.; (small mononuclear, 19 per cent.; large mononuclear, 2 per cent.); transitional, 1 per cent., and eosinophiles, 16 per cent.

Diagnosis.—General peritonitis, probably gonorrhœal in origin.

Operation.—Ether, drop method on open Esmark inhaler. Abdomen opened through Kammerer incision 2¼ inches in length over right rectus. Upon opening the peritoneal cavity some seropurulent fluid escaped. The intestines appeared very much distended and injected. The appendix was slightly injected, but otherwise appeared normal and not adherent. Several collections of purulent fluid were found between the intestines, one of which was located near the splenic region.

The pelvis contained a large abscess and the tubes felt thickened, but owing to the extreme distention of the intestines, could not be exposed. On several coils were deposits of lymph. Cultures and smears were taken by Dr. I. Strauss, pathologist of the hospital. Much of the fluid contents of the peritoneal cavity was mopped up with sterile dry sponges. The appendix was removed.

A small cigarette drain was inserted to the stump of the appendix, and another into the pelvis, and the remainder of the wound sutured. The bowels were moved at end of twenty-four hours, after which vomiting ceased. In addition to stimulation, she was given two injections of Torrey's anti-gonococcus serum, obtained through the kindness of Dr. Strauss. There was nothing noted after the injection of the serum which might have any bearing upon the course of the disease. The temperature was normal at end of the first week; all drainage was discontinued on the tenth day.

September 4, patient was discharged feeling perfectly well and the wound entirely healed. The vaginal discharge still showed the presence of gonococci four weeks after leaving the hospital.

Bacteriological report by Dr. I. Strauss, pathologist of the hospital: Patient, R. J., operated upon August 2, 1906. Spreads of vaginal discharge showed numerous pus cells, many intracellular Gram-negative diplococci or gonococci. Fibrin and exudate from peritoneum; numerous gonococci in masses of fibrin. No

pus cells; other bacteria absent. Cultures from peritoneum gave gonococci in pure culture on serum agar and serum sugar agar. Cultures from vaginal discharge contain gonococci. Appendix normal.

The case was therefore definitely an instance where the diffuse peritonitis was due to gonococcal infection alone, and a review of the literature of the subject (including 74 cases reported) present several points of interest for consideration.

Etiology.—Gonorrhœal peritonitis can exist in the male, but judging from the very few cases reported must be uncommon, and is caused by the infection extending along the lymphatics of the cord to the peritoneum. One such case with positive bacteriological findings at autopsy was reported by Challan in 1893.

In the female it may be a complication of an *acute* gonorrhœal vulvo-vaginitis, and, as pointed out and demonstrated by Veith, Cumston and others, gonorrhœa may be the sole cause of peritonitis arising during the second or third week of the puerperium. The infection is conveyed to the peritoneum either through the lymphatic system, or, as more commonly demonstrated by cases operated, the peritonitis is due to the emptying of the gonorrhœal pus direct into the general cavity through the patent ostea abdominalis.

Gonorrhœal peritonitis may also be produced by direct infection during removal of an acute pyosalpinx, an instance of which is the case of Frank's, already narrated in this paper. That diffuse gonococcal peritonitis is not more common may be accounted for by the gummy or adhesive character of the exudate, which causes adhesions and confines the infection to the pelvic peritoneum or to the tube itself by sealing the fimbriated extremity.

With a view of ascertaining the dangers which might follow the rupture of a pyosalpinx, several investigators undertook to examine bacteriologically a number of tubes removed surgically.

Menge in 1891 reported results of his examination in 26

cases of purulent salpingitis and found bacteria in 8 of these, 3 of which contained gonococci. All three gonorrhœal tubes had ruptured during the operation, and their contents caused a soiling of the peritoneum. One of these patients died, and post-mortem one and one-half hours later showed streptococci in the peritoneal cavity.

Andrews, in 1904 (cited by Dudgeon and Sargent), published the results of bacteriological examination of the interior of the tube in 684 collected cases of pyosalpinx. The diagnosis in most instances was based upon microscopy only; some upon both films and cultures; and a few upon animal experiments. The result showed 55 per cent. to be sterile; 22.5 per cent. to contain the gonococcus, 6 per cent. saphrophytes only, and the rest a variety of pyogenic organisms. These figures, being based largely upon very incomplete bacteriological examinations, must be received with a good deal of reserve, but they go to show what a small proportion of cases of pyosalpinx constitute any grave danger to the peritoneum.

Symptomatology.—Several observers, notably Saenger, Charrier, Rousseau, Comby, Northrup and others, attempted to describe characteristic diagnostic features of diffuse gonorrhœal peritonitis, and the abrupt or explosive onset with very serious aspect is mentioned by Comby and Northrup as characteristic of this malady.

A careful perusal of the histories of the cases so far reported show that the symptoms do not differ materially from those elicited in peritonitis from other causes.

Ruptured appendicitis has in several instances been mistakably diagnosticated. Nor is it always possible to differentiate clinically an acute pelvic from an acute diffuse peritonitis of gonorrhœal origin.

Prognosis and treatment have occasioned much discussion, owing to the view taken by some of the observers, particularly the French writers, who are inclined to take a very favorable view as to the outcome.

That gonorrhœal peritonitis is capable of producing a fatal septicæmia is proven by cases reported by Frank, Mejia

V. Leyden, Muscatello, Frank and Koehler, Lilienthal (quoted by Welt-Kakels), Koplik, and others.

Most writers agree that acute diffuse gonorrhœal peritonitis is particularly fatal in children.

In 1896 Broese reported 2 cases of vulvo-vaginitis complicated with symptoms of diffuse peritonitis, in which operation was deferred and both recovered. These and similar cases reported by Comby, Northrup, Sebilleau, Galvagno, Marfan, render the indications for operations questionable.

Most of these cases lack, however, the bacteriological proof of their gonorrhœal origin, and some lack the sufficient evidence that they were diffuse, but rather only pelvic peritonitis with severe symptoms.

Of the 75 cases collected, including the writer's case, only 30 had the diagnosis fortified by autopsy or bacteriological examination.

A detailed review of all the cases is precluded by the brevity of time allotted to me to the reading of the paper—a brief summary only will therefore be presented for your consideration.

Of these 30 cases, 14 resulted in death of the patient. There were 20 operated upon with a mortality of 4. Two of the deaths of the operated cases cannot be ascribed to the operation, nor alone to the gonorrhœal peritonitis.

One case by Hunner and Harris developed bronchopneumonia after operation, and at the autopsy, while the gonococcus was recovered in the peritoneal cavity, streptococci were found in the blood of the heart, in the lungs, bladder and other organs.

Second case is one of Dr. Koplik's, cited by Dr. Welt-Kakels, a child which had undergone two serious operations for empyema, developed a general peritonitis for which she was operated by Dr. Elsberg in the service of Dr. Lilienthal at Mt. Sinai Hospital. Cultures from the peritoneum proved the peritonitis to be of gonococcal origin.

The child was certainly not in a favorable condition, and therefore it is hardly fair to ascribe to the operation a contributory cause of her demise.

If we exclude these two cases, we have 18, with a mortality of 2—certainly a small one.

Conclusion.—Diffuse gonorrhœal peritonitis is a serious and sometimes fatal malady, which, when not operated, is likely to leave a legacy of pus tubes in the female already doomed to sterility and possibly lasting invalidism.

Diffuse gonorrhœal peritonitis may recover with palliative or symptomatic treatment alone, but we must continue to operate some of the cases with reasonable assurances of recovery.

The number of cases of gonorrhœal peritonitis operated upon will be diminished when we will have the means of making a positive diagnosis as to the bacteriological character of the infection, or when a satisfactory antigonococcic serum will be at our disposal.

It is hoped, however, that the discussion occasioned by this report will enable us to bring to light some more clinical data which will help us to outline definitely the course to persue in cases of suspected acute diffuse gonorrhœal peritonitis.

Conclusions: The gonococcus is capable of producing a local or a diffuse peritonitis without the presence of other pyogenic bacteria.

BIBLIOGRAPHY.

1. Neisser, A. Centralblatt für mediz. Wissenschaften, No. 28, 1879.
2. Bumm, Ernst. Der Micro-organisms der gonorrhoischen Schleim; Hauterkrankungen "Gonococcus Neisser," Wiesbaden, 1885.
3. Saenger. Archiv für Gynäkologie, Bd. xxviii, page 474, 1886.
4. Loven, G. Hygeia, 1886.
5. Hatfield, M. P. Archives of Pediatrics, 1886.
6. Ceppi, E. Ref. Wien med. Wochenschrift, page 386, 1888.
7. Huber, F. Trans. American Medical Society, vi, 1890.
8. Penrose, C. B. Medical News, July 5, 1890.
9. Baumgarten. Jahresbericht, vol. vi, page 137, 1890.
10. Raether. Centralblatt f. Gynäkologie, page 733, 1890.
11. Thiroloix. La France Med., No. 139, 1890.
12. Menge, K. Zeitschrift f. Geburtshülfe in Gynäkologie, vol. xxi, page 119, 1891.
13. Wertheim, E. Centralblatt f. Gynäkologie, page 484, 1891.
14. Stevens, J. L. Lancet, May, 1891.
15. Charrier, P. R. Thèse de Paris, 1892.
16. Horowitz. Wiener med. Wochenschrift, Nos. 2 und 3, 1892.

17. Wertheim, E. Arch. f. Gynäkologie, vol. xlii, page 1, 1892.
18. Zeissl, M. V. Allg. Wiener med. Zeitung, page 534, 1892.
19. Bumm, E. Arch. f. Gynäkologie, vol. xxviii, page 476, 1893.
20. Huber, F. Archives of Pediatrics, vol. x, page 325, 1893.
21. Challan. Gazette Med. di Torina, m. 40, p. 792, ref. Baumgarten, Jahresber., page 84, 1893.
22. Veit. Handbuch d. Gynäkologie, vol. iii, No. 2, page 841, 1893.
23. Mermet, M. P. Gaz. Méd. de Paris, page 367, 1893.
24. Chaput. Bulletins de la Société Anatomique de Paris, page 246, 1894.
25. McCosh. ANNALS OF SURGERY, February, 1895.
26. Menge, K. Centr. f. Gynäkologie, No. 29, 1895.
27. Frank, L. The Medical News, Oct. 19, 1895.
28. Boose, P. Berliner klin. Wochenschrift, vol xxiii, page 779, 1896.
29. Kiefer, T. Verhandlungen d. 68 Vers. deutscher Natur-forscher u. Aertzte, Frankfort, A. M., vol. ii, page 434, 1896.
30. MacCann, F. J. British Med. Journal, vol. xi, page 1774, 1896.
31. Baginsky. Berliner klin. Woch., vol. xxiii, page 261, 1896.
32. Sutton, B. British Med. Journal, vol. ii, page 1309, 1896.
33. Marfan. Revue Mensuelle, Maladies de l'enfance, 1897.
34. Machenrodt. Zeitschrift f. Gebrustsch. in Gynäkologie, vol. xxxvi, page 190, 1897.
35. Mejia, R. Thèse de Paris, 1897.
36. Nicolaysen. Centralblatt f. Bacteriol, vol. xxii, page 305, 1897.
37. Korte, W. Mittheilungen aus der Grenzgebieten, der Medizin und der Chirurgie, vol. ii, page 167, 1897.
38. Veit. Dermatol. Zeitschrift, vol. i, No. 2, page 165, 1897.
39. Braquehaye, J. Bull. et Mem. de la Soc. de Chir. de Paris, page 730, 1898.
40. Leyden, V. Mittheilungen in Verein f. innere Med. Berlin, vol. v, xi, 1899.
41. Muscatello. Policlinico, August, 1899.
42. Rousseau. Thèse de Bordeaux, No. 43, 1898, 1899.
43. Cushing, H. W. Johns Hopkins Hospital Bulletin, vol. x, page 75, 1899.
44. Doederlein, C. Veits Handbuch für Gynäkologie, vol. iii, second half, page 840, 1899.
45. Cumston. Am. Journal Obstetrics, October, 1899.
46. Gardner, W. Montreal Medical Journal, 1900.
47. Miller, E. B. Johns Hopkins Hospital Bulletin, vol. xi, May, 1900.
48. Metzner. Zeitschrift f. klin. Med., vol. xxxix, page 558, 1900.
49. Wilisch, O. Inaugural Dissertation, Leipzig, 1901.
50. Von Brun. Central. für Allgemeine u. pathologische Anatomy, vol. xii, No. 1, page 11, 1901.
51. Comby, J. Archives de Médic. des enfants, vol. iv, 1901.
52. Dowd, C. N. ANNALS OF SURGERY, vol. xxxv, page 276, 1902.
53. Frank and Koehler. American Journal of Obstetrics, page 398, 1902.
54. Hunner and Harris. Johns Hopkins Hospital Bulletin, vol. xiii, page 121, 1902.

55. Spratt, C. W. Johns Hopkins Hospital Bulletin, vol. xiii, page 247, 1902.
56. Barbat, J. H. Occidental Med. Times, San Francisco, vol. xvi, page 377, 1902.
57. Northrup, W. P. Archives of Pediatrics, December, 1903.
58. Eppstein, Graucher and Comby. Traité des Maladies de l'enfance, vol. ii, 1904.
59. Welt-Kakels, Sarah. N. Y. Med. Journal, October, 1904.
60. Andrews. American Journal of Obstetrics, February, 1905.
61. Dudgeon, S. S. and Sargent, P. W. G. Bacteriology of Peritonitis, 1905.
62. Dubreuilh, M. Thèse de Paris, 1904.
63. British Journal of Children's Diseases, 1904.
64. Foulerton, A. G. R. Journal of Obstetrics and Gynæcology of British Empire, vol. vii, page 404, 1905.
65. Monclaire, M. Bull. Soc. de Pediat. de Paris, vol. vii, page 104, 1905.
66. Leopold, G. Centralblatt f. Gynäkologie, October, 1906.
67. Koplik, H. Diseases of Children, 1906.
68. Cupler, R. C. Annals of Surgery, January, 1907.
69. McDonald, E. Annals of Surgery, February, 1907.

SOME PRACTICAL DEDUCTIONS FROM PERSONAL EXPERIENCE IN THE TREATMENT OF APPENDICITIS.*

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NOTWITHSTANDING the large and rapidly increasing experience in operating for appendicitis, there seems still to be a wider divergence in the opinions held and the methods practised than can fairly be attributed solely to temperamental differences among those who hold and practise them. And upon at least two points—the wisdom and character of interference in the gravest form of cases and drainage—this divergence is so great that the views held on one side are directly opposed to and condemnatory of those held on the other. As a contribution toward the possible establishment of more uniformity in opinion and practice I have collated my personal hospital statistics for the past four years and beg now to place them before you. The period of four years was chosen because, while brief enough to insure practical uniformity of practice, it is yet, I think, long enough to protect against the usual errors of chance.

The services are those of the New York and the Hudson Street Hospitals. The former covers a total of about sixteen months—four services of about four months each between October, 1903, and February, 1907, and a few intermediate cases. The latter covers my personal work during 1903–1906, about thirty months. To avoid misapprehension I may add that, while the list is wholly operative, yet it excludes no admitted case that died; cases which recovered without operation are not included. The New York Hospital list was made by the Librarian from the card index, and its completeness and accuracy are supported by contemporaneous reports made to

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the Board at the end of each term of service. The Hudson Street Hospital list was made by the house surgeon from the bound volumes of case reports for the four years.

The New York Hospital service presumably differs but little, if at all, from that of any other large city hospital, and from private practice mainly in that a somewhat larger proportion of the cases are probably first seen in the later stages of the disease. In the Hudson Street Hospital service this difference is rather more marked, for the community which it serves is poorer and less well provided with private medical advice. Of course, in a hospital the provision for operating and safeguarding the patient is in some respects better than in private.

A classification of the cases for the purpose of this paper is not easily to be made, for the symptoms, the gross pathological changes found at operation, and the apparent gravity of the cases do not closely correspond. It has long been the practice in the laboratory of the New York Hospital to subject all appendices removed at operation to a systematic examination, and the results of many of these examinations form part of the histories. They show quite uniformly a series of changes of an inflammatory and ultimately ulcerative character, starting in the mucosa. Of these, the lowest, apparently representing recovery from a moderate inflammatory attack, is an atrophy of the mucosa with local or general narrowing of the lumen. Next is a round-cell infiltration of the mucosa, extending more or less through the other coats and reddening or even roughening the surface and sometimes associated with partial necrosis of the mucosa. Then comes "a fibrino-purulent exudate" in all the coats, with partial or complete necrosis of the mucosa, and in the later stages ulceration and perforation of the entire wall, the latter apparently taking place with special frequency at points corresponding to enteroliths of various sizes. The perforation may occur promptly, on the first day, and in one case was absent on the eighth day, although pain, tenderness and rigidity had been marked throughout.

The grade of peritoneal reaction does not correspond closely with the condition of the appendix or with the length of

time since the onset of the attack. A general peritonitis, shown by abundant turbid serum throughout the cavity, may be present by the second day and with only a partial necrosis of the mucosa of the appendix and a round-cell infiltration of its wall. In 2 of the 4 cases, of this kind, of the list the appendix was not perforated. And many cases of abscess, walled in or free, and of localized collections of turbid serum coexist with an appendix that shows to the naked eye only hyperæmia of the surface and stiffness and enlargement of more or less of its length, and under the microscope any of the changes from thickening of the mucosa to its necrosis, and from round-cell to fibrino-purulent infiltration of the coats.

I have, therefore, roughly grouped the cases according to the character and extent of the peritoneal reaction. Some of the dividing lines are necessarily arbitrary and somewhat vague, and some of the groups might perhaps as fairly be combined with each other as separated.

Group I is of the cases of general peritonitis. In all there was abundant turbid serum or even thin pus throughout the peritoneal cavity.

Group II includes the cases in which similar exudates were found beyond the immediate neighborhood of the appendix and pelvis, but not everywhere.

In Group III this reaction was limited to that neighborhood and to the hollow of the pelvis.

In Group IV there was an abscess completely walled off, with or without adjacent peritoneal reaction.

Group V is composed of those numerous cases with which all are so familiar—the "acute suppurative," the "acute gangrenous," and some of the "acute catarrhal" forms; the appendix is swollen, rigid, congested or perhaps grayish in color,—sometimes free or with few adhesions, sometimes buried amid them or behind the cæcum or colon and then pliable and softened by inflammatory changes.

Group VI includes the milder cases, the subsiding attacks, some of the recurrents, those in which the pain seems to have been due to an obstruction of the lumen of the appen-

dix rather than to an acute inflammation, those, in short, in which the inflammation is but slight.

Group VII includes the "interval" operations.

The cases are as follows:

Group.		New York Hospital.	Hudson Street Hospital.
I.	General peritonitis	3	1
II.	Extensive peritonitis	5	4
III.	Local and pelvic	9	6
IV.	Closed abscess	16	6
V.	Acute appendicitis	24	11
VI.	Subacute appendicitis	7	3
VII.	Interval operations	3	0
	Total	67 (No deaths.)	31 (1 death.)

All of the New York Hospital cases recovered, and all of the Hudson Street Hospital cases except one. The fatal case was in Group II—extensive peritonitis with a perforated appendix; he survived until the eighth day. It is but fair to add that the clean record of the New York Hospital list would have been broken had it not been for my enforced absence on one occasion. The case was an urgent one of extensive peritonitis on the fourth day; another surgeon operated; the patient left the table in good condition but died fifteen minutes later with symptoms of pulmonary embolism.

The main principle of the operative treatment has been to do the least that would probably be sufficient to accomplish the object, whether that were the arrest of an appendicitis or of a peritonitis. The work is done rapidly, the incisions are as small as the conditions permit, the intestines handled as little as possible and usually protected with flat sponges (not gauze pads) as soon as the peritoneal cavity has been opened.

In 9 of the 98 cases, in which the position of a palpable mass made approach from the median line advisable, the curved transverse incision with longitudinal separation of the recti (the incision which I habitually use instead of median laparotomy) was employed. In all the others McBurney's intermuscular "gridiron" incision was used. My preference for

the latter has long been unshaken and is, I think, unshakable, and I deem it one of the most valuable of the many valuable things we owe its distinguished author. It not only leaves the wall unweakened after recovery, but it also wholly avoids injury to the nerve supply of the rectus. With care and patience it gives ample room in most cases for the necessary intra-abdominal work, and if more space is needed it can be easily had by extending the cut in the fascia across a portion of the sheath of the rectus and drawing that muscle inward, or, if room must be made upward, by cutting upward alongside the rectus for an inch or so. The work ended, this supplementary incision is closed with interrupted sutures of chromic catgut, and I have seen no ill consequences follow. In the 98 cases it was used 5 times. The extension into the sheath of the rectus is noted in only 6 of the histories, but I am confident that it was made to a slight extent in several others.

As soon as the cavity has been opened, and if it is dry, the finger is cautiously introduced to determine the situation of the appendix and the general conditions. Of the simple cases it is not worth while to speak, for the technique of the removal of the appendix presents no serious question. If the finger finds a mass, one or two flat sponges are pressed in and tucked down on the lower side to crowd back the intestines from the iliac fossa and protect them and the hollow of the pelvis from possible contact with pus; then the finger seeks lines of least resistance in the mass and is cautiously pressed onward, usually between the mass and the posterior parietes, while an assistant stands ready with stick-sponges. As soon as pus is felt or seen it is quickly sponged away as it flows out from the little abscess, and when the flow has ceased the sponges are passed into the cavity until it has been thoroughly dried. Then the finger again enters the abscess cavity and seeks to free the appendix. It seems to me advisable to do by touch as much as can be so done, rather than to make wide exposures in order to see. One can generally recognize by its greater resistance the portion of the meso-appendix which contains the artery, and can safely tear through the rest if he cannot readily

expose it for ligation. Such bleeding as ensues soon stops, or the point can be exposed and caught.

If the appendix can be thus found and freed I usually secure the stump by simply tying it with a catgut ligature after having cauterized its interior with the fine Paquelin point. When the base of the appendix and adjoining wall of the bowel are not inflamed and can be brought into easy reach I use the purse-string silk suture and invagination of the stump; but I never use it when the wall has been softened by inflammation. In two cases the appendix has separated at its junction with the cæcum, leaving a rather large opening. This I closed with sutures in the usual way.

When the appendix is found detached, or has been torn away by the manipulations used to free it, I make no great search for its stump if it is not readily accessible, but leave it for spontaneous closure. Three stumps in this list were thus left untied with no recognizable ill results. A fæcal odor may persist for some time in the discharge, but not longer than in other cases where the stump has been tied, or there may be a slight admixture of fæces in the discharge for a few days.

If the appendix is not accessible without a wide exposure and extensive separation of adhesions, if the patient is old and feeble or his condition grave, I content myself with simply wiping out the cavity and providing drainage. In 7 of the cases in this list the appendix was thus left untouched, and in only 2 of them did it give rise to further trouble; in each after an interval of two months. In one, which had fully healed, the patient returned with the usual symptoms of an attack; I opened him along the scar, found a small foul abscess and the appendix easily accessible, and removed it. In the other a sinus had persisted; I enlarged it and easily found and removed the appendix. Of the 98 cases of the list, in 37 the stump was invaginated with a purse-string suture, and in 49 it was simply tied.

Of course, it is well that an inflamed appendix should be removed; there is probably even no important loss to the patient in the removal of a healthy appendix, but I am sure

that the removal of the appendix is not necessary to the cure of an appendicitis and possibly not even to the patient's reasonable security against another attack. At least, in one case in which for various reasons I felt constrained to limit my interference very narrowly, I saw a simple half-inch opening in the abdominal wall, with immediate escape of pus and drainage for a few days, followed by complete freedom from attacks for a period that is now nine years. And yet the patient had previously suffered for two years from repeated attacks.

In the young, such caution may be superfluous; but in the old, whose tissues and organs have felt the strains of competition, luxury, or want, whose abdominal walls are fat and flaccid, the less draft we make upon them the better. And so, too, with those who are very ill: let the operation be limited to the life-saving indications, and let us not take a counsel of perfection which adds a strain that may be beyond the patient's powers of resistance.

If the pus is not encapsulated, if it lies free between the cæcum and the wall, perhaps with some free thin exudate showing at the incision, it is treated in the same way—carefully sponged out and the area dried. So, too, if there is also a collection within the pelvis; a few introductions of sponges on handles will remove it. Occasionally, when the collection has been larger than usual, I have removed it by washing with salt solution, using a double tube which afforded an easy escape for the wash and aiding the escape by keeping the sides of the incision wide apart. In the cases of extensive and general peritonitis, likewise, I have used the same tube, but always under low pressure and with free escape, and using only small quantities of water, just enough to effect the removal of so much of the exudate as would easily come. The main reliance has been upon gentle sponging. This seems to me safer than large incisions and abundant washing, and I am not sure that even less would not be sufficient in those graver cases, as it has proved to be in the less extensive peritonitides of the III and IV Groups. And it leaves the patient, in the case of survival, free from the weaknesses and discomforts of large

abdominal scars. Space is lacking to give the histories of these graver cases in detail. I must leave you to estimate their gravity upon the length and continuity of the list and the extent of the peritoneal reaction. In addition, in the few of the 12 recoveries of the first two groups in which the leucocyte and differential counts have been preserved, the divergence from the normal line set by Dr. Gibson was on the dangerous side and the bacterial examination showed mixed streptococcus and B. coli communis infections.

Drainage was used in all of the first four groups and in 29 of the 48 cases of the last three groups. Three forms of drains were used: first, and most frequently, the cigarette drain; secondly, small strips of gauze, either alone or in conjunction with the cigarette; and in 6 cases, where the need seemed to be slight, only a strip of rubber tissue. In the cases of the first three groups the cigarette drain was passed down into the pelvis, and sometimes a second one, or a strip of gauze passed upward toward the liver or toward the opposite side. In one of the cases of general peritonitis a second opening was made on the left side for a drain. These cigarette drains have always been removed or much shortened within three or four days, and the gauze strips have been taken out on the second or third day. The retention of the short drains leading to the abscess cavity or the stump of the appendix has been determined by the amount and character of the discharge. They have been used also in a few clean cases in which there has been much oozing or tearing of adhesions. In one case of large fæcal abscess lying close by the promontory of the sacrum and reached by the median route, the drain was passed through a counter-opening in the loin.

I am strongly convinced of the value of drainage, and would not willingly forego the feeling of security which it gives. I am quite ready to concede that many of the cases in which I use it would recover without it; but what weighs upon me is the uncertainty lest there may be some among them in which its absence will mean an added danger, another operation, or even death. Its disadvantages are not more, I

think, than trifling inconveniences—a brief delay in the final cicatrization of the wound and a momentary pain in the withdrawal. The rubber drain has not even those if it is removed on the first or second day. Why should we leave even a small post-operative exudate or bleeding to be cared for by the peritoneum when it is so easy to remove them?

Finally, it has been urged, with statistics to support, that in grave cases abstention will save more lives than operation. This list contains 13 cases of general or extensive peritonitis with only one death. Suppose that not all of the cases should be counted as grave. Cut the list in half and call it 6 cases with one death. Can abstention do better? Is not the question rather one of the extent and character of the operative interference? Let that be brief and limited to what can be done quickly, easily, and with the minimum of exposure and handling of the intestines, and even, if necessary, to drainage alone. Surely nothing is lost by providing an escape for the exudate and reducing the task of the body to taking care of the bacilli and the toxins which it contains. I do not even ask for the washing of the cavity. As I have said, I use it only in moderation as a gentle means of quickly removing a large amount of exudate, with no thought of making that removal complete. In short, let us remember that we are dealing with very ill patients whose strength is already taxed to the utmost by their disease and who have no reserve with which to meet the drafts we may make upon them, and let us reserve our ideally complete operations for the young, the strong, for those appendices whose potentiality for harm has as yet been only slightly manifested.

MOTOR-BOAT FRACTURES.

BY HENRY P. DE FOREST, M.D.,

OF NEW YORK.

Surgeon to the Police Department.

SINCE the days of prehistoric man certain occupations have been productive of certain peculiarities of physical development and have been attended by certain accidents as direct results. Were records available of the physical condition of the early hunters we would find "bow-fingers" as well as bow-legs. With the advance of civilization these physical characteristics became more numerous and more generally recognized. A monograph, for the use of expert criminologists in Paris, describes several hundred varieties of callosities and deformities caused by occupation. Hardly a trade can be mentioned that does not produce certain well marked physical characteristics if the same posture or motion be continued for any length of time.

Such stigmata are of chief value to men who are working with Bertillon methods for the purpose of identifying individuals, but at times they are of such severity as to require medical treatment. In the domain of surgery, "housemaid's knee," "miner's elbow," and "porter's shoulder" have been recognized for years, while "writer's cramp" is equally well known to physicians in general.

The occupations that produce such lesions are, in most instances, necessary ones and can hardly be given up or avoided; but of recent years, with the advent of many new kinds of "sport," it has been found that the favored few who have little to do but play, instead of work, are by no means free from similar conditions. "Base-ball finger" was the first of these to appear and then, in turn, came "lawn-tennis elbow," "football knee," "runner's leg," "catcher's shoulder," and "bicycle face."

The list of games that may demand a price of similar value

in return for their enjoyment might be extended to a considerable length. Foot-ball, tennis, base-ball, hand-ball, lacrosse, bicycling, hurdling, and foot-racing all contribute to the list. In the more violent forms of athletic exertion "putting the shot" not infrequently causes serious sprains.

CASE I.—Mr. W. J. D., a doorman in the police department, while engaged with some of his friends in "putting the shot" felt a sudden and severe pain in his right elbow. He paid no especial attention to the matter until the following morning when his arm was found to be greatly swollen and irregularly ecchymotic. The disability continued. He reported sick but did not admit the cause of the injury at first, stating that he was subject to rheumatism. Some months later a considerable contracture persisted and when he first came under my care the joint was almost useless. The exact nature of the trouble was only determined by the use of Roentgen rays. The radiograph showed no injury to the bones. He was accordingly sent to the hospital and anæsthetized with gas. As soon as volition disappeared the joint was fully extended and after free flexion and extension it was secured in full extension by a splint. The following day, because of some pain in the arm, he removed the splint and the arm at once returned to its original angle of contracture. He declined to have anything further done to the arm and now, about 3 years after the injury, the contracture still persists (Fig. 1).

Even the simple and ancient game of quoits is not free from danger to the participants, aside from the risk of being struck by the quoit itself. The sudden twist of the wrist given as the iron leaves the hand may in itself do damage.

CASE II.—Mr. T. K., a patrolman in the police department, while playing a game of quoits felt something snap in the right wrist and pain and swelling developed after a short interval. The radiograph showed that the ligament had torn loose from the styloid process of the ulna and that a considerable separation of the bones at that part of the wrist joint was the result. Immobilization for about a month was needed to secure good functional result (Fig. 2).

FIG. 1.—Radiograph showing contracture of right elbow joint. Sprain caused by "putting the shot."

FIG. 2.—Radiograph showing sprain of right wrist with rupture of styloid ligament, caused by "pitching quoits."

During the bicycle craze a number of cases were observed by the writer in which the constant vibration of the handle-bar during long rides over rough roads produced numbness and even temporary paralysis of the fore-arms, and in one or two cases, the hard and small wooden saddle caused similar conditions of the legs, combined with severe sciatica. The vibration of the machinery and steering wheel of the modern automobiles has already caused similar symptoms in chauffeurs. Even physicians who drive their own cars are not exempt, and the writer has, at the present time, under observation a surgeon whose skill as an operator is seriously impaired by the wide muscular tremor that his hands have acquired since he joined the ranks of those who use horseless carriages.

Still more recent are the injuries that have been received by those who are using motor-boats, and to these the present article especially directs attention. In most instances the machinery of the boat, usually with gasoline as a motive power, is started by hand. The more or less heavy balance wheel of the engine has a permanent handle projecting from the rim, or a heavy brass or iron rod sunken in a socket and held in place with a spiral spring when not in actual use. When the engine is started this handle is seized and the wheel turned quickly around. If the gasoline and air mixture is right and the electric spark really sparking, a single turn may be all that is necessary to start the series of explosions within the cylinder that drive the engine. It frequently happens that the conditions are not right for a great variety of reasons which can be learned by the hour from the owner of any motor-boat. In any event the wheel has to be turned a number of times before the engine will start; one hand is used, it becomes tired; the other is used, it, too, becomes tired; then both are used. Ultimately, if all goes well, the shaft becomes heated, or the water dries out of the gasoline tube, or the carburettor produces a good mixture, or something else happens and the machinery starts, sometimes with great rapidity. The handle escapes from his grasp, flies around, and before the man has time to get out of the way he is struck by it on the hand. In case the

handle is in a socket, the spring is supposed to bring it flush with the rim of the wheel as soon as it is released, but if the handle is rusty, or the spring is weak, or the handle binds in the socket, this does not always occur, and injuries with this type of handle are as frequent as when a stationary pin is used.

The injuries that result from this impact are usually trifling, but the following series of cases which occurred at a single wharf during the past summer will show that some of them may be very serious. Inquiry at other places would doubtless give other and perhaps larger lists.

Case III.—Mr. A. D., aged 30, while starting his gasoline engine was struck on the calf of the left leg by three successive revolutions of the fly wheel. The bones of the leg were not fractured but the clothing was torn and a considerable portion of the gastrocnemius muscle was torn away in the badly contused and lacerated wound that resulted. The first impact was so violent that the leg was numb and he could not move for a moment or two. Considerable loss of power in the leg still remains after some months and a marked limping gait will probably be permanent.

Case IV.—Mr. J. S., aged 35, injured in a similar manner. The handle struck his right hand before he could get it out of the road and badly lacerated the index and middle fingers, breaking the middle phalanx of the latter. Recovery uneventful.

Case V.— Mr. C. S., aged 22, was struck by the stationary handle of his gasoline engine and the first phalanx of the index finger of the left hand was fractured. Recovery uninterrupted.

Case VI.—W. S., a sergeant of police, aged 42, was injured in a similar manner: the sparking adjustment was wrong and the wheel flew backwards, the handle striking him on the back of his right hand. When this case was seen after twenty-four hours there was considerable swelling and ecchymosis of the hand. At the first of the examination a distinct crepitus was felt but only once, and continued manipulation could not again elicit this symptom. In the belief that there was some obscure form of fracture present, the patient was radiographed and it was discovered that the blow, occurring on the side of the metacarpal of the right index finger, had caused a linear fracture

FIG. 3.—Radiograph showing linear fracture of metacarpal bone of right index finger. Caused by recoil of handle of motor-boat engine.

FIG. 4.—Radiograph showing "tent-shaped" fracture of fourth right metacarpal bone. Caused by recoil of handle of motor-boat engine.

extending proximal into the joint. Only at the very tip of this fragment could crepitus be felt (Fig. 3). A moulded metal splint was used and an excellent result was obtained. At the end of five weeks he was again able to return to desk duty. Such a linear fracture is unusual.

CASE VII.—Mr. C. B., aged 34, was another victim. In his case also the explosion took place at the wrong phase of the engine cycle and he was struck on the under side of the right hand in the middle of the palm. The fourth metacarpal bone received the brunt of the impact and was fractured at its middle in an angular direction so that the ends of the fragments of bone formed a tent-like elevation upon the dorsum of the hand. The deformity produced was more pronounced than usual, for in most instances the adjacent bones act as splints and the broken bone is held in good position in this manner. The angular deformity is shown in Fig. 4. With the aid of the radiograph a pad was placed over each extremity of the bone on the palmar side and a single pad over the angular projection on the dorsum. Two small glass rods, with rounded ends, on each side of the bone, corrected the tendency to lateral displacement and with these occurred in a moulded metal splint the result was excellent.

CASE VIII.—Mr. B. C., aged 33, was injured by a similar blow upon the back of the right hand. His hand became much swollen and discolored but he thought it merely a bruise and did nothing for it until two weeks had passed when the continuance of the symptoms caused him to come for treatment. With the former cases in mind, although no crepitus could be detected, a radiograph was made and a transverse fracture of the fourth right metacarpal bone was found (Fig. 5). The bone was in perfect alignment and was held so by the action of the two adjacent metacarpal bones. This plate is also interesting as it shows another form of injury received in play, a "base-ball finger," due to a fracture of the first phalanx of the little finger, received some years ago. In this case a simple splint for immobility was all that was needed to secure an excellent result with no deformity.

CASE IX.—Mr. F. S., another member of the police force of the city, aged 48, received a more serious injury. He was struck by the flying handle upon the left wrist and the radius was fractured in two directions giving lines like the letter X (Fig. 6).

The force of the impact was received upon the dorsum of the wrist and the resulting deformity was that of an exaggerated Colle's fracture. Good recovery in five weeks.

CASE X.—Similar to Case VII but still more serious, was that of Mr. W. F. who was struck in a similar manner upon the wrist, but from beneath, by the flying backward of the released handle. A compound fracture of the right wrist resulted and considerable laceration and contusion of the soft parts about the broken radius and ulna. So severe was this injury that it seemed probable an amputation might be necessary. This was averted, however, by carefulness and cleanliness, and a fair result was obtained.

CASE XI.—Drowning does not seem at all likely to occur as a result of such an injury, but this was nearly the fate of Mr. A. S., a slender man of 23, who was engaged in starting the engine. The explosion again occurred at the wrong cycle, the handle flew backwards and struck his right wrist on the upward turn of the wheel. The force of the blow was so great that not only did he sustain a compound fracture of the right wrist but he was thrown bodily overboard into the waters of the bay. He was no swimmer and was so stunned by the injury that, had not help been promptly at hand from those who saw the accident, the victim would have drowned. It is probable that some portion of clothing became entangled in the handle of the wheel and so gave sufficient attachment to throw him overboard. A serious illness resulting from the immersion developed, in addition to the shock of the compound fracture, and operative procedures and it was some weeks before he finally recovered. It is not unlikely that one or two drowning accidents noted in the daily newspapers during the past season occurred in a similar manner, as motor boats have been found running without a driver and the body of the man was afterwards found injured and drowned.

Similar injuries occur during the "cranking" of an automobile, and once the attention of the surgeon is directed to the subject it is surprising how many cases can be secured. During the past month while the matter was uppermost in his mind the writer has had his attention called to a number of such accidents.

FIG. 5.—Radiograph showing transverse fracture of fourth right metacarpal bone. Caused by recoil of handle of motor-boat engine.

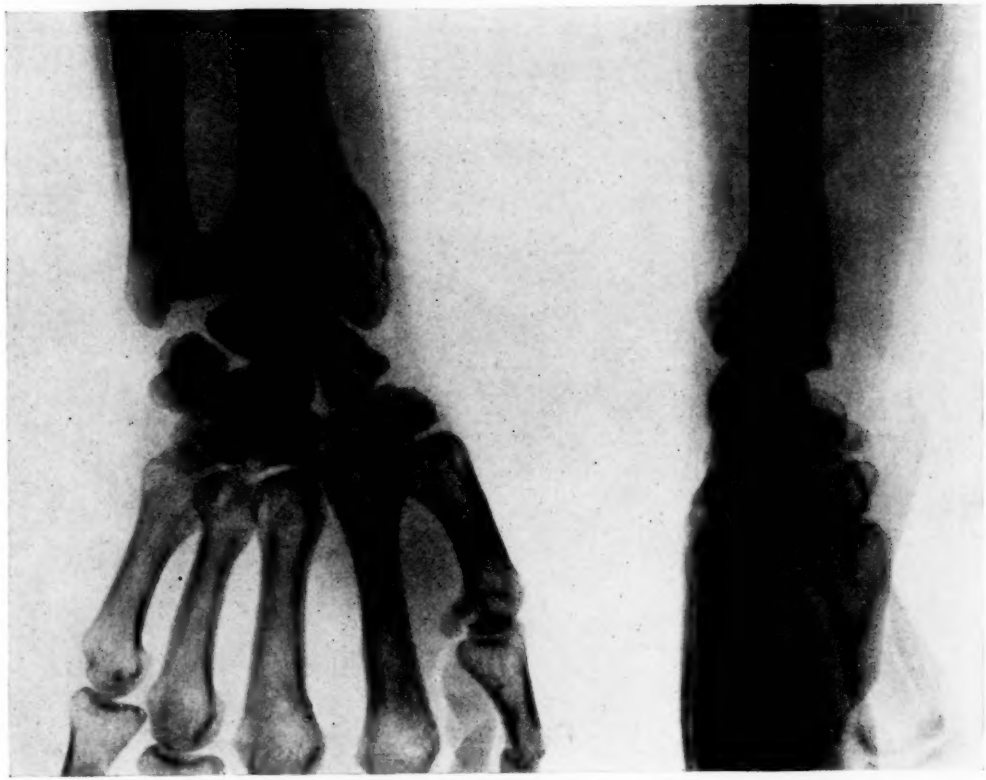

FIG. 6.—Radiograph showing X-shaped fracture of left wrist caused by recoil of handle of motor-boat engine.

CASE XII.—W. B. B., a physician, while engaged in starting the engine was struck on the right wrist by the rebound of the crank at the time of the primary explosion. The radius was broken close to the wrist joint and in two places, very similar to those shown in Fig. 6. This physician reports that he has had about six cases, similar in character, in his personal charge during the past year. He lives in the neighborhood of a garage and they have been sent to him for immediate treatment.

CASE XIII.—Dr. C. D., another medical man, met with a similar experience. In his case instead of pushing down on the handle with the arms rigid he was nearly at the highest point of the circle when the explosion occurred. The crank did not leave his hand but the backward impulse was so sudden and so violent that the radius was broken completely across; the ulna was not injured (Fig. 7). The deformity at the time of injury was extreme.

CASE XIV.—Mr. T. A. R., while cranking his machine, had the spark too far advanced and the explosion occurred at the wrong phase of the engine; the handle flew backward, striking him below the knee, breaking both bones of the leg.

Two cases have been called to the writer's attention in which the patella was broken. Minor injuries to the leg, and particularly to the knee are common. The daily press (*New York Sun,* November 1, 1906) has recently reported a case in which the nose was broken and the skull was also fractured.

Type of Fracture.—The fact that the initial velocity of the flying handle is much greater than that of the human body, in case of a fall, or of that of falling timbers, stones, and the ordinary causes of fracture in everyday life, has a marked effect upon the lines of fracture and causes them to resemble those produced by large calibre projectiles without the penetrating effects. The fracture, as a rule, occurs at the point of actual impact, and is rarely transmitted to the weaker parts of the bone. So localized, indeed, is the injury that fragments of bone may be broken off or such small bones as those of the carpus may be individually broken. The lines of fracture are, as a rule, quite straight and the direction taken may be most unusual.

Diagnosis is often quite difficult, and the use of the fluoroscope and radiograph is imperative in cases of doubt.

The hand and wrist receive the greater number of injuries, but the fingers are pushed aside easily and quickly so that fractures in the phalanges are not common. On the other hand, the metacarpal bones seem to be fractured most frequently, and injury to the carpus, sprains or even an actual fracture is not rare. When the force of the blow is expended directly upon the fore-arm or leg the injury may be more severe, and compound fractures are not uncommon in these localities.

Etiology.—When these cases are studied to determine the cause of the explosion taking place when the driver is unprepared or during the wrong phase of the engine cycle, it would appear that the majority are due either to carelessness or to ignorance. Too many persons buy a car or a boat, are taken out for a trial trip, are shown the essentials of starting and of stopping, buy the machine, and fancy that by reason of having paid the purchase money they are thereby granted the degree of mechanical engineer. The dangers are slowly becoming known and actual schools for instruction for the complete construction and management of motor-boats are now established. The first of all to be established is maintained by the Y. M. C. A. of this city, and the practical demonstrations of their craft on the Harlem on Friday and Saturday afternoons, with the numerous apparent accidents, have caused the uninitiated to call it the " Jonah Boat."

The best of instruction cannot prevent carelessness, and the attitude taken by the manager of a motor company, who sustained a badly injured wrist with fracture of one of the carpal bones and a resulting excision and did not care to have the case reported for several reasons, shows that familiarity does not protect against the possible danger.

All agree, that most of the accidents occur while the handle is being pushed downwards with the weight of the body upon the rigidly held and extended arms. If the handle is pulled up it is safer, and if the explosion does occur at that time

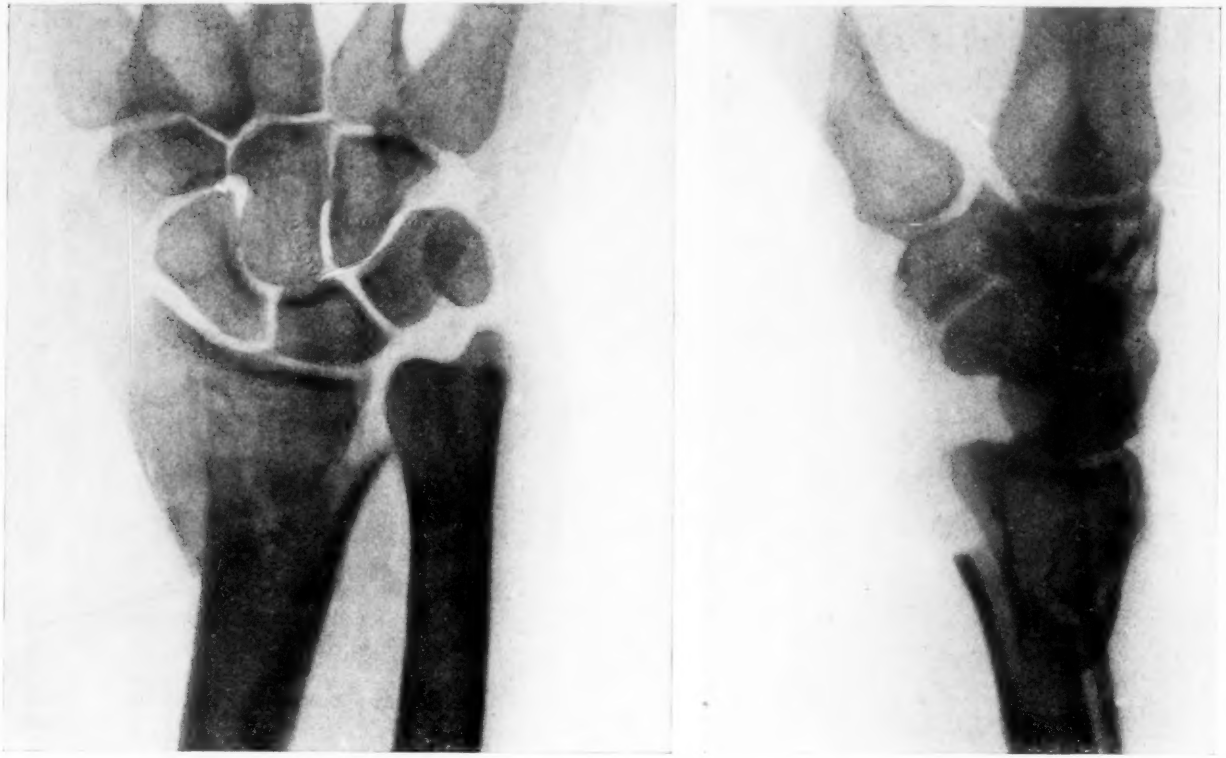

FIG. 7. Radiograph showing fracture of right radius caused by recoil of handle while "cranking" automobile.

the handle flies away from the grasp, and is much less apt to do damage to the driver. In automobile accidents the legs receive the larger number of injuries as the crank is higher from the ground. In the automobile, however, the force is transmitted from the crank to the engine through the medium of a ratchet, so that the crank does not continue to revolve. Then, too, if the effort be made always to stand clear of the crank and apply the force by pulling up instead of pushing down, the chance of accident is greatly lessened.

With motor-boats, especially those whose engines have been placed in sail-boats, cat-boats, dories, and the like, to give auxiliary power when needed, the mechanism is much more simple and the space in which to avoid the flying handle is much less. Accidents are common enough in both classes, and with a little effort the above record could be greatly amplified.

TRANSACTIONS

OF THE

NEW YORK SURGICAL SOCIETY.

Stated Meeting, March 13, 1907.

The President, Dr. George Woolsey, in the Chair.

DORSAL MENINGOCELE.

Dr. William A. Downes presented an eight months' old infant, which at birth had a pure meningocele the size of a walnut in the dorsal region of the spine (Fig. 1). It gradually increased in size, but under very careful protective treatment it never became inflamed nor irritated, and gave rise to no ill-effects. There was no associated deformity or malformation. The patient was brought to the Babies' Hospital, and operated on last December. A circular incision was made through the skin, and the pedicle of the tumor was dissected out. It communicated with the spinal canal at about the level of the third dorsal vertebra. The child made an uneventful recovery, and there had been no leakage since the operation.

Dr. Downes called attention to the size and unusual location of the meningocele and the fact that it was covered by membranes almost entirely. A slight strabismus which existed at the time of the operation had disappeared. The child is now perfectly well and there is no evidence of hydrocephalus which often follows operation for the relief of this condition, especially when situated in the sacral or cervical regions.

Dr. Royal Whitman said that in his experience club-foot was more often associated with spina bifida lower down, and in such cases it was often accompanied by partial or complete paralysis and loss of sensation,—rather unusual complications when the defect was of the upper portion of the spine.

Dr. George Woolsey thought that a meningocele proper

was rarely seen so high up as in the case shown by Dr. Downes. The usual location of these tumors was in the lumbosacral region. Another peculiarity of the case was the incomplete skin covering, as most pure meningoceles had a complete covering.

TUBERCULAR PERITONITIS.

Dr. Charles N. Dowd presented a girl, twelve years old, who was first seen by Dr. Geo. M. Ball on Saturday night, November 24, 1906. She had apparently enjoyed good health up to the preceding Thursday morning, although she had had two or three previous attacks of pain and vomiting. On Thursday she had had a severe attack of vomiting, and her bowels had moved slightly, twice. On Friday morning she vomited once, and two or three times on Saturday. The vomitus on that day had a fæcaloid look, and in the evening was very forcible in character. She stated that all day she had had difficulty in preventing vomiting. There was moderate rigidity in the right hypochondrium, but no abdominal distention. Her pulse was 90; temperature normal. She was taken to St. Mary's Hospital at once. The vomiting persisted during the night, and on the following morning the temperature was 99.5; the pulse 130; the rigidity had increased, and was especially marked on the right side of the abdomen. There was no distention.

Operation was done without delay. Upon opening the abdomen, there were well-marked evidences of tuberculosis of the appendix, the head of the colon and the lower end of the ileum. The appendix was removed. An abscess cavity containing about 2 ounces of tubercular pus was found in the mesentery, about 5 inches above the ileocæcal valve, which had by its pressure produced absolute occlusion of the intestine at that point. It was emptied by sponges, and the patency of the intestine was thus restored. There was considerable free serum in the lower part of the abdominal cavity. The abdomen was closed without drainage, and healing occurred by primary union without incident, thus again illustrating the desirability of omitting drainage in these cases. The patient made a good recovery, and had since remained in excellent health. She has gained in weight, has had no further intestinal symptoms and now appears to be very vigorous and strong.

Dr. Dowd presented a second case of tubercular peritonitis

in the person of a girl, nine years old, who came under his observation on April 25, 1905. She had enjoyed good health until two weeks prior to that date, when she began to complain of pain in the right side of the abdomen, with irregular fever, and loss of appetite and strength. Upon admission to the hospital, there were evidences of fluid in the abdominal cavity.

Operation, May 1, 1905: The omentum was found much thickened; it was at least 2 inches thick and extended very little below the umbilicus. A section taken from it showed extensive tuberculosis. The intestines also were studded with tubercles wherever they were seen. After this operation, a sinus persisted in the abdominal wound, and the child was sent to the country for two months. Upon her return the sinus was curetted, and the wound ultimately healed. She was discharged from the hospital January 30, 1906, and had since remained in good health, and is now the picture of ruddy strength, although in all probability many tubercles still remain within the abdomen.

TENDON TRANSPLANTATION.

Dr. Charles N. Dowd presented a boy who was six and a half years old when he came to St. Mary's Hospital on May 18, 1905. Four years prior to that date he had fallen and injured his back, and for eighteen months subsequent to that injury he was unable to walk. At the time of his admission to the hospital there was marked atrophy of the extensor muscles of the left leg and thigh, and the left foot was inverted to such a degree that he hobbled about on its outer edge.

Operation: The tendon of the tibialis anticus was split, the division being carried well up among the muscle fibres. The posterior half of the tendon was left attached in its normal position, while the lower end of the other half was separated from its attachment, was carried outward and secured to one-half the tendon of the peroneus longus, which had also been split, but the displaced part was severed at its upper end.

The result of the transplantation was excellent, and the inversion of the foot had been practically corrected. Even without the aid of a short steel support, which the boy still wore, he was able to walk with entire comfort, and placed his foot squarely on the floor. Since nearly two years have elapsed since the operation, a fair trial has been given to the procedure.

Dr. Royal Whitman said that when tendon grafting was first introduced, it had been regarded by many as an actual cure for various deformities of the limbs, especially as the immediate results were usually very striking. Further experience, however, had demonstrated that partial relapse was the rule. He considered it as of comparatively limited value unless combined with other procedures, such as arthrodesis at the centres of deformity, or unless, as in the present case, a protective brace was worn.

The speaker also called attention to the importance of splitting a muscle high up and separating it completely into two parts if it were to act effectively as independent muscles.

Dr. Dowd said that in several cases where he had split the tibialis anticus he had found it a very satisfactory procedure, and that it was an excellent measure in helping to maintain the equipoise of the foot. He agreed with Dr. Whitman that a complete cure should not be looked for by tendon transplantation, and that some kind of a brace should be worn continually to help maintain the position. In this case it had certainly accomplished a great deal, since the boy placed his foot squarely on the floor and with the help of an inconspicuous "drop foot" brace he was able to walk with almost a normal gait.

CARCINOMA OF THE BREAST AT SIXTEEN.

Dr. George E. Brewer presented a negress who had been admitted to the Roosevelt Hospital in January, 1907, suffering from a small, hard nodule in the upper and outer quadrant of the right breast. She stated that as long as she could remember there had been a "small round ball" under the skin near the areola. This was not painful, and had given her no trouble until six months ago, when it began to grow larger and apparently gave rise to painful sensations in the breast.

On examination, a hard, somewhat elastic oval nodule was felt, which was distinctly circumscribed and freely movable. It had no attachment to the skin nor to the pectoral muscles; the nipple was not retracted, and no axillary lymph nodes could be felt. The growth was regarded as a fibro-adenoma, which was possibly cystic.

The tumor, together with a small amount of breast tissue,

was removed through a straight incision radiating upward and outward from the nipple. On microscopic examination the growth was found to be an intracanalicular adenopapilloma which had undergone distinct carcinomatous degeneration. As soon as the pathological report was received, the patient was again etherized, and a complete Halsted operation was done. Her recovery was uneventful.

Dr. William B. Coley said he had never seen a carcinoma of the breast under the age of twenty. Among the 2,713 cases of carcinoma of the breast recently collected by Heimann, there were only 4 under the age of sixteen—about 1 to 700. Under the age of twenty there were 7 cases, the proportion being about 1 to 400.

Dr. Parker Syms said that Beatson of Glasgow had called his attention to one point in the differential diagnosis between benign and malignant tumors of the breast. In the former, the nipple line on the affected side would be lower than that on the opposite side before there had been retraction, while in a malignant case the nipple line on the affected side would be higher than that on the opposite side.

In connection with this general subject, Dr. Syms asked the opinion of the members as to the propriety of making an exploratory incision in a case of breast tumor of a doubtful nature, and how much risk accompanied such a procedure. He said that he resorts to this procedure occasionally.

Dr. Dowd thought it was very desirable to make an exploratory incision into a breast tumor of doubtful character before determining the extent of the operation. He knew of cases where such a precautionary measure would have prevented the performance of radical operations for fibroma and inflammatory growths in this region. At best, the radical operation occasionally resulted in considerable discomfort, with occasional swelling of the arm and pain on the affected side; these were defects that did not apply to the old Volkmann operation. For that reason, a preliminary incision, with the examination of sections by the freezing microtome, was very important in certain cases. It is done under anæsthesia as a part of the regular operation.

Dr. Woolsey said he had always regarded a preliminary incision and the immediate examination of frozen sections a safe and desirable measure in the differential diagnosis of breast

tumors. As an additional safeguard to prevent infection, he advised cauterization of the cut surfaces, and, if the growth proved to be malignant, the radical operation would of course be indicated at once. The complete removal of all the glands and surrounding tissues would prevent the spread of any cancer cells, set free by the incision, into the tissues beyond the field of operation.

DR. E. S. JUDD, of Rochester, Minn., suggested the advisability of removing every tumor of the breast as soon as it was discovered, irrespective of the age of the patient.

DR. COLEY agreed with Dr. Judd that it was very important to remove these so-called benign and cystic tumors as soon as they were discovered. He recalled one case at the General Memorial Hospital where a cystic tumor of the breast had been treated by another surgeon by hypodermic puncture three years before. Three years later the cystic tumor had degenerated into a typical carcinoma and the disease was too extensive to permit a radical cure.

DR. BREWER said he was not in sympathy with the rather widespread belief that it was dangerous to make an incision into a doubtful tumor of the breast. His own practice was that whenever he had to deal with a tumor of the breast it should be freely extirpated, and then frozen sections should be immediately examined in order to establish its true character. In a recent textbook on surgery, it was stated that there was very little evidence to show that benign tumors of the breast ever became malignant. This, Dr. Brewer said, he considered bad teaching, as he could personally recall at least three cases seen in one year, where benign tumors had become malignant. The case he had shown at this meeting was another example of the same kind. The speaker emphasized the importance of the removal of all these tumors as soon as they were discovered.

THE SURGERY OF PERITONEAL TUBERCULOSIS.

DR. PARKER SYMS read a paper with the above title, for which see page 95.

DR. JUDD said that he thought Dr. Mayo's idea was that the primary lesion in the peritoneal tuberculosis was always some point in the mucous membrane and not in the peritoneum itself, and the great desideratum in operating was to discover the loca-

tion of the primary lesion. It was only by finding and removing the primary focus that a permanent cure could confidently be looked for. In the female, this primary focus was usually in the tubes—probably in three out of four cases. In the males operated on at Rochester the appendix, if possible, was removed in all cases, and it proved to be the primary focus of the disease in about 50 per cent. In several instances the primary lesion was found to be in the stomach, duodenum or gall-bladder, and in other cases there was a distinct tubercular lesion in the cæcum or ileum.

Dr. Dowd said that a review of the literature had suggested the query as to how much proof we had that simple incision of the peritoneum had much effect on peritoneal tuberculosis. The statistics did not show a very great preponderance in favor of cases operated on, and when we bore in mind the vague character of the symptoms in this condition, it was perfectly justifiable to assume that many cases of tubercular peritonitis had recovered in which the diagnosis had never been made. The speaker said that in the two cases he had shown at this meeting the condition had gone unrecognized until it was far advanced and there was a sudden outburst, evidenced in one case by intestinal obstruction, and in the other by an effusion of fluid into the peritoneal cavity. He had also looked over the histories of the cases which had come under his own observation and had found very little evidence of the curative effect of simple incision but abundant evidence of the evasive, indefinite nature of the disease. These cases numbered 29, verified by operation or autopsy. In 3 of them unsuspected, yet extensive, peritoneal tuberculosis was found in operation for hernia. In 3 instances the vermiform appendices were the site of the maximum inflammation and were removed. In 2 instances, pieces of tubercular intestines were resected with good results. In 2, tubercular uterine appendages were resected also with good results.

In 14 instances extensive plastic exudate was present. This is the type which authorities generally agree upon as unaffected by simple incision. In one of them who died from intestinal obstruction, a cure was supposed to have been accomplished by medical treatment. Another case illustrates very plainly the difficulty in diagnosis; a year and a half after the first operation another operation was done for persistent sinus, and the intestines

were found everywhere studded with tubercles, although the abdomen was soft, undistended, and, excepting for the sinus, had seemed normal. The type with marked serous effusion is the one which is supposed to be most benefited by incision, but this is the early stage of the inflammation in most instances and the one which is most likely to do well under any treatment.

In peritoneal tuberculosis, Dr. Dowd said, we were certainly dealing with a very evasive disease, and it was difficult to interpret the effects of treatment, either medical or by simple peritoneal incision. While an operation in these cases seemed advisable, it should not be undertaken on the ground that in some remarkable or mysterious way it would cure the disease, but rather on the ground that by opening the abdomen we might discover the source of the infection and remove it.

Dr. Coley said he was entirely in accord with Dr. Dowd that this question of peritoneal tuberculosis was still very obscure, and that it had not been absolutely decided that an operation would cure many more cases than would medical treatment. Neither did he believe that removal of the appendix would always effect a cure in this condition. The speaker said he could recall several cases upon which he had operated for hernia, and had found the hernial sac studded with tubercles, although the patients had given no symptoms pointing to a tuberculous lesion. In one case he had operated for a ventral hernia following an operation for appendicitis in which another surgeon had removed a tuberculous appendix two years before. The sac of the ventral hernia was filled with small tubercles, as was also the neighboring parietal peritoneum. The patient continued to grow worse and died about a year later in spite of the two laparotomies.

Dr. Brewer said that many of the cases that had been referred to illustrated a well-recognized principle in surgery, namely, that, given a case of tuberculosis, if we could remove the primary lesion the case would be able to take care of itself. This was noticeably so in tuberculosis of the kidney and other organs of the genito-urinary tract. After the removal of a tuberculous kidney, for example, the involved ureter would often be able to take care of itself.

Dr. Woolsey said that he agreed with Drs. Dowd and Brewer in regard to the importance of removing the original focus in these cases, but he was not quite so optimistic in regard

to the value of the medical treatment. He could recall several cases with effusion where under medical treatment the patients had gone from bad to worse, and where an operation, even without discovering the primary focus, had produced at least a temporary cure.

In speaking of the primary focus in these cases, Dr. Woolsey said he had seen it in the several localities where it was most often found, including a number of times in the appendix. He recalled one of the first recorded cases of appendectomy, operated on by Dr. Hall in 1886, where the appendix had been removed for that distinct reason. The case was one of supposed hernia, and the tuberculous appendix had been found in the hernial sac. The speaker said he had recently operated on a Japanese where the primary tuberculous lesion was in Peyer's patches in the ileum. The retroperitoneal glands were also extensively involved, and there were tubercular lesions in other regions of the body, including the lungs. In one case of peritoneal tuberculosis where the patient refused a radical operation and injections of iodoform emulsion were advised, the method proved painful and unsatisfactory.

Dr. Syms, in closing, said the statistics of peritoneal tuberculosis showed that as far as we could compare series of cases, these patients did better under surgical than under medical treatment. While the serous type did fairly well under any treatment, the surgical treatment was superior to the medical. Mayo and others had shown that a large proportion of these cases were curable by rational surgical treatment, even where medical treatment and perfect climatic conditions had failed.

Stated Meeting, March 27, 1907.

The President, Dr. George Woolsey, in the Chair.

ACUTE DIVERTICULITIS OF THE SIGMOID, WITH INTRA-ABDOMINAL ABSCESSES.

Dr. George Emerson Brewer presented a man, forty-five years old, who had hitherto enjoyed good health. He had never

suffered from digestive disturbances suggestive of appendicitis, gall-stone colic or peritonitis.

In August, 1902, while at dinner, he was suddenly seized with an attack of abdominal pain, with nausea and faintness, which necessitated his leaving the table. The severity of the attack soon passed off, and he was able to join his friends later in the evening. The following night proved a restless one, as he had more or less constant pain in the lower portion of the abdomen, which prevented sleep, and at times was accompanied by nausea and general bodily weakness. The following day he continued to feel badly, but he kept up and about for the reason that he was a guest at a country house and did not wish to inconvenience his host. Later in the day he went for a drive, and suffered acutely from the jolting of the vehicle. In the evening he was obliged to call a physician, who, after an examination, pronounced the case one of colitis. He returned to the city the following day, and, as the symptoms continued, he remained in bed. During five days he continued to suffer with pain in the lower left quadrant of the abdomen, together with fever and general malaise.

When Dr. Brewer first saw the patient, his temperature was 103; pulse, 110; leucocytes, 17,000. There was marked rigidity of the left rectus muscle, and a tender mass in the iliac fossa. He was immediately removed to the Roosevelt Hospital, and under ether anæsthesia an incision was made over the most prominent portion of the tumor. After dividing the tissues of the abdominal wall, a large abscess cavity was entered which contained about 4 ounces of foul pus, and an oblong fæcal concretion. On washing out the abscess cavity, a small ulceration was seen in the wall of the sigmoid, through which there was a slight fæcal discharge. The cavity was packed with sterile gauze, the wound partly united, and a dressing applied.

After operation, the temperature and pulse rapidly declined to normal, the pain ceased, and the appetite returned. The discharge from the abscess cavity gradually diminished until a cathartic was administered on the fourth or fifth day. This gave rise to a very abundant fæcal discharge which continued for several days. It then began to diminish, and the sinus finally closed in about six weeks from the time of operation. He had since been in perfect health.

Dr. Woolsey said he had seen these diverticulæ of the gut at autopsy, but never as a cause of infection. The case shown by Dr. Brewer was interesting as bearing on the etiology of left-sided intra-abdominal infection.

CARCINOMA OF THE SPLENIC FLEXURE OF THE COLON.

Dr. George E. Brewer presented a man, forty-seven years old, who was admitted to the Rosevelt Hospital in January, 1907, suffering from acute intestinal obstruction, vomiting, and marked prostration. He gave a history of having had numerous attacks of abdominal pain during the previous nine or ten months, which had always yielded to cathartics and a careful regulation of the diet. Two days before admission he had had such an attack, but the cathartic administered by his attending physician had failed to produce any movement of the bowels, and there had occurred vomiting, increased pain, and a progressive distention of the abdomen. When seen by Dr. Brewer in consultation, the abdomen was uniformly distended and moderately tender. As numerous enemata had failed to bring about any evacuation, and as no gas had been passed for twenty-four hours, an immediate operation was advised.

Under ether anæsthesia the abdomen was opened in the median line. The small intestine and the ascending and transverse portions of the colon were greatly distended. The sigmoid was collapsed, and palpation revealed a hard mass in the splenic flexure. As the distended cæcum lay directly beneath the abdominal wound, it was opened with a trocar, and about 1 quart of fluid fæces evacuated. The small opening was closed, the bowel stitched to the abdominal wound, and reopened with the Paquelin cautery the following morning.

There was a moderate amount of shock following the operation, but after the fistula was established and the bowels freely moved, the patient's condition improved, and two weeks later a second operation was undertaken for the removal of the growth. The colostomy wound was sealed with gauze and rubber tissue, and a long incision made over the descending colon extending from the twelfth rib to the iliac fossa. A dense carcinoma was found, involving about 3 inches of the colon, just below the splenic flexure. The transverse colon was brought into the wound, clamped, and divided about 2 inches above the growth. The

descending colon was freed from its attachments, clamped, and divided just above its junction with the sigmoid, and the intervening portion of the gut and a generous piece of the mesocolon were removed. Both open ends of the intestine were closed and turned in by purse-string sutures, and a lateral anastomosis was made between the transverse and sigmoid portions by the suture method. The surrounding tissues were then thoroughly disinfected, and the wound closed by layer suture, a small cigarette drain being left in the upper angle.

The patient rallied well from the shock, and aside from a moderate infection of the subcutaneous tissue of the wound he made a prompt recovery. On the fifth day following the operation a fair-sized movement occurred by the natural passage, and after that the colostomy wound gradually closed. When he was discharged from the hospital, six weeks after the operation had been performed, he had an excellent appetite and was gaining rapidly in both weight and strength. The microscopical examination of the specimen showed it to be adeno-carcinoma.

DR. WOOLSEY called attention to the fact that in the case shown by Dr. Brewer the intestinal symptoms had been present nine or ten months. The speaker said he had seen two cases of carcinoma of the splenic flexure, and in both of them there were no premonitory symptoms until the time of the obstruction, which in the first case was absolute. The latter patient was brought to the hospital four days after the onset of the obstruction, and an artificial anus was established. In the other case a resection was done.

BLASTOMYCOSIS OF THE SPINE.

DR. GEORGE E. BREWER presented a man, twenty-three years old, a native of Russia, who was admitted to the Roosevelt Hospital in January, 1907. For the past six months he had suffered from pain between the shoulders, stiffness of the back, and a progressive loss of weight and strength. On examination, a large, fluctuating swelling was found between the scapulæ over the spinous processes of the third and fourth dorsal vertebræ. On aspiration, a dark, chocolate-colored fluid was withdrawn. There was moderate rigidity of the dorsal spine, pain on motion and marked tenderness over the swelling.

Under ether anæsthesia, an incision, 15 cm. in length, was made over the tumor, and the tissues divided until the abscess was reached beneath the erector-spinæ muscles. About 4 ounces of pus were evacuated. On further examination, it was found that the spinous process of one of the vertebræ, together with a portion of its lamina and the arch of an adjacent vertebra, were exposed and more or less necrotic. These were removed, and the entire abscess cavity dissected out. The surrounding parts were then douched with a 1-100 solution of formalin, and the extensive wound united by deep and superficial sutures. Practically no reaction followed the operation, and the wound healed without suppuration. The patient left the hospital in about two weeks.

Three or four weeks later he returned, complaining of pain in the lumbar region, and upon examination a similar fluctuating tumor was found lying to the right of the upper three lumbar spines. The wound of the primary operation had remained healed, and free from tenderness. The second operation was similar in every respect to the first, with the exception that only the tip of the transverse process seemed involved. The recovery from the second operation was somewhat delayed by suppuration in the wound, but the patient was able to leave the hospital, completely healed, in three weeks.

Microscopical examination of the pus and tissues removed from both foci showed abundant blastomycetes. No cutaneous nor other primary lesion could be found, and there was no evidence of lung involvement or lesion of any other organ or tissue.

Dr. Brewer said this was the first case recorded of an apparently primary blastomycotic lesion of bone, and the only case of involvement of the spine in which improvement or cure had been noted.

Dr. William B. Coley said that he at present had under observation at the General Memorial Hospital a case of acute blastomycosis with very rapid generalization, which, apparently, was not primary in the skin. The patient, a man in vigorous health up to last December, began to have severe pains in the dorsal region of the left foot. The foot became very much swollen and in a few days showed fluctuation. Shortly after this two small nodules developed in the skin of the lower portion of the outer aspect of the right thigh. These were slightly elevated

above the surrounding surface, presenting indurated edges and ulceration in the centre, with a tendency to form dry scabs. Very soon four or five similar lesions appeared in the face. At about the same time the patient developed a dry hacking cough which has persisted ever since and has been almost constant. In addition to the skin lesions described, a number of subcutaneous lesions appeared in various parts of the body, the majority in the thighs, some on the arms and some on the neck and forehead. These varied from the size of a hazlenut to that of a hen's egg. If left to themselves, in a week or ten days they became very much softened, showing fluctuation and, finally, ulceration in the centre, discharging a brownish-colored material of about the consistence of cream. In the fluid taken from such tumors before ulceration occurred, pure cultures of blasomycetes were found, which have been successfully inoculated into dogs, producing similar tumors. The lesions in the face have almost entirely disappeared under applications of pure carbolic acid left on for a minute and followed by alcohol. The patient is steadily growing worse, although he has been put on iodide of potassium, getting as much as 250 grains a day. Hæmoglobin has fallen to 35 per cent. The case will be published in detail later.

PERSISTENT FÆCAL FISTULA FOLLOWING GENERAL PERITONITIS.

Dr. George E. Brewer presented a colored boy, nineteen years old, who was admitted to the Roosevelt Hospital in the summer of 1906, suffering from acute general peritonitis. He was operated on by Dr. Charles H. Peck, who found a diffuse suppurative infection, which apparently involved every portion of the membrane, which could be seen through an incision extending from the ensiform to the pubis. As the condition of the patient was extremely critical, and as the intestines were so matted together by inflammatory exudate as to preclude the possibility of an extensive search for the point of infection, the large abdominal wound was rapidly closed in part, leaving drains in the upper and lower angles. Considerable shock followed the operation.

He was critically ill for several weeks, and during his convalescence developed two fæcal fistulæ, one at the upper, and one

at the lower extremity of the abdominal wound. Through these two openings there poured out practically all intestinal contents for many weeks. At times the condition of the fæcal discharge would be semi-solid, indicating a communication with the colon, and at other times the discharge would suggest a high jejunal fistula.

The boy emaciated rapidly, and became extremely weak and anæmic. He rallied, however, and the amount of fæcal discharge diminished; but as soon as he gained a little strength and was able to take more food the fistulæ would again enlarge, and great quantities of matter from the small intestine would then be discharged.

In October he came under the observation and care of the reporter. At that time he was exceedingly pale and thin, and presented the evidences of a poor surgical risk. He pleaded so hard for operation, however, that it was finally decided to make the attempt. On opening the abdomen, the upper fistula was found to lead to a sinus which passed along the portal fissure of the liver, and then downward along the right side of the ascending colon to about its middle, where it communicated with the colon by an opening as large as a silver quarter. The lower fistula communicated with two loops of the small intestine, one of which was apparently the jejunum. It also communicated with a sinus which passed to the right iliac fossa around the cæcum to the outer side of the ascending colon and joined the sinus from the upper opening. The two openings in the small intestine were closed by Lembert sutures. The entire sinus was next dissected out, and the opening into the colon closed by two rows of Lembert sutures, and reinforced by an omental graft. The abdominal cavity was then closed, drains being left at four points in the course of the extensive incision.

The operation was an exceedingly difficult one, and required nearly an hour and three-quarters for its completion. One of the difficulties encountered was due to the fact that the intestines were absolutely matted together by a chronic tuberculous peritonitis, the progress of which had evidently been arrested either by the mixed septic infection or by the original operation for its relief.

There was considerable shock following the operation, which was combatted by active stimulation. The boy rallied slowly, and

eventually made a satisfactory convalescence. Although two of the drain openings suppurated, at no time was there any fæcal discharge from the wounds. As soon as he was able to be up and move about the ward, he gained rapidly both in weight and strength.

Dr. L. W. Hotchkiss said that during the past winter he saw a case somewhat similar to the one shown by Dr. Brewer. This patient was also a negro and had had an acute onset of abdominal pain, and while an exact diagnosis was impossible, there was apparently an acute peritonitis, due probably to a perforation. Upon opening the abdomen, the intestines at pyloric end of stomach were found somewhat reddened, and the peritoneal cavity was filled with a non-purulent fluid. The appendix, stomach, and gall-bladder were apparently normal. The case was regarded as one of the acuter forms of tubercular peritonitis, although the cultures were negative. The abdominal wound subsequently broke wide open, making a secondary operation necessary, which resulted in a good union being obtained and the patient was discharged from the hospital apparently well.

SECTION OF THE COSTAL ARCH FOR BULLET WOUND OF THE LIVER.

Dr. Irving S. Haynes presented a man, twenty-three years old, who was brought to the Harlem Hospital on October 18, 1906, with a gunshot wound of the abdomen. The wound of entrance was just below the tip of the ensiform. There was no wound of exit.

As soon as possible, a median incision was made under ether anæsthesia, and the course of the bullet through the liver noted. In order to reach the exit wound in the liver the skin and right rectus muscle were divided transversely opposite the base of the ensiform and the seventh and sixth costal cartilages severed at about their middle. The falciform ligament was also cut through from the umbilicus to the top of the liver, close to the abdominal wall and diaphragm. With strong traction upon the severed costal arch the posterior wound in the liver could be reached and felt but not seen. It readily admitted the index and middle fingers. By the fingers an iodoform wick was packed into this wound and a smaller wick introduced into the anterior wound in the left

lobe of the liver. Both wicks were brought out through the abdominal incisions. No wound was felt in the diaphragm.

The packing in the liver wounds checked the hæmorrhage, but not entirely, until the liver was forced upward against the diaphragm. To hold it there a large Mikulicz packing of plain gauze was introduced beneath it. The rectus was sutured. The peritoneum with the falciform ligament included, and the different layers of the abdomen sutured above and below the iodoform wicks. Nothing was done to the severed cartilages.

On October 29, the Mikulicz packing was removed and the gap in the abdominal wall closed by silk-worm sutures previously placed for such purposes. A few days later the iodoform wicks were removed and rubber tubing substituted. The discharge was very free, consisting of bile and pus.

On November 10, an operation to establish drainage posteriorly was performed as the space behind the liver was not draining properly.

Before this the bullet had been located in the mid-axillary line on the right side and about over the ninth rib. The incision was made in this place and the bullet with the sac in which it was perfectly encysted removed entire. One and one-half inches of the ninth rib was resected, the chest opened. The costal and diaphragmatic pleuræ were united by very delicate and fine adhesions; so these two layers were firmly sutured to the external opening. The pus cavity was located by an aspirator and the diaphragm opened alongside the needle.

By means of a long curved probe passed from the anterior wound over the liver, a good-sized rubber tube was drawn from the posterior wound to emerge from the anterior one. Further drainage was provided by a short tube into the abscess cavity. The long drainage tube was removed after a few days and all discharge drained from the second incision.

The case progressed slowly but satisfactorily. He was out of bed on November 18, and left the hospital on December 4. He came back for a week's stay about three weeks later as the drainage was not satisfactory. This was remedied by inserting a good-sized tube and firmly strapping the abdomen about his waist so as to crowd the liver upward and obliterate the abscess cavity. These measures succeeded, though the discharge did not entirely cease until the early part of this month (March).

The interesting features about this case are: The large hole through the liver—controlled by gauze packing within—and compression from below upward against the diaphragm. The great amount of working space afforded by section of the rectus muscle and the sixth and seventh costal cartilages. The prompt union of these cartilages without any special precautions. The effective drainage of the subphrenic abscess from the mid-axillary line over the ninth rib. The presence of bile for a long time in the purulent discharge. The escape of the patient from embolism, for many of the large hepatic veins must have been thrombosed.

COMBINED OPERATION FOR HERNIA AND FOR REMOVAL OF APPENDIX.

Dr. William B. Coley presented a man, illustrating Torek's incision, combining removal of the appendix with operation for inguinal hernia. The patient was sent to the General Memorial Hospital about four weeks ago, on the diagnosis of strangulated hernia. It was found that only omentum was contained in the sac and that his acute symptoms were due to inflammation of the appendix. Temperature and pulse were normal. The operation was postponed for two or three days, and then the usual Bassini incision for inguinal hernia was made, the aponeurosis being incised ½ to ¾ inch higher than usual. By retracting the aponeurosis well, it was very easy to separate the fibres of the internal oblique, as in the ordinary McBurney incision. The appendix was found acutely inflamed, and removed, the internal oblique sutured, and then the hernia operation was completed in the usual way.

A week ago, Dr. Coley did a similar operation in a boy of twelve. Dr. Coley reverses the order of the operation as practiced by Dr. Torek, who does the hernia operation up to the point of tying off the sac, then beginning the appendix portion of the operation, while Dr. Coley believes it better to attend to the appendix first.

SOME PRACTICAL DEDUCTIONS FROM PERSONAL EXPERIENCE IN THE TREATMENT OF APPENDICITIS.

Dr. Lewis A. Stimson read a paper with the above title, for which see page 122.

Dr. George E. Brewer said that while the generally accepted views in regard to the proper treatment of appendicitis were apt to undergo modification from time to time, yet in studying the statistics presented by Dr. Stimson—comprising a list of 98 cases operated on at a general hospital, with but 1 death—one could not but be impressed with the fact that the method of the operator was an important factor in the result. In this series of practically unselected cases, many of them acute, the mortality was about 1 per cent. The minimum amount of operative interference was probably responsible for the excellence of these statistics. The dictum was now generally accepted that the less we handled the inflamed intestines the better the result; the less we interfered with the appendix, the less would be the danger to the patient.

In regard to the question of drainage in these cases, Dr. Brewer said he had passed through all the various stages, and his views on the subject were practically as follows: He believed that all acute cases in which there was no extensive peritonitis, should be closed without drainage; also, that all acute cases in which there was no necrotic matter, should be closed without drainage. When necrotic matter was present, he invariably used drainage. In the absence of necrotic material, he saw no advantage in drainage, as the drain simply benefitted the immediate neighborhood in which it was placed, and could exert no beneficial effect upon a spreading generalized peritonitis; such cases he thought were much more satisfactorily treated without drainage.

Dr. L. W. Hotchkiss said he agreed entirely with the position as defined by Dr. Brewer, and was very glad to know that the views of Dr. Stimson coincided so closely with his own which he had taken occasion to express in a paper read before the Society in 1906. The only point of difference, practically, was as to the necessity of drainage in generalizing or diffuse suppurative peritonitis, meaning by this, a condition in which the pus was very generally distributed throughout the peritoneal cavity without visible encapsulation, and where the focal infection necrosis in and about the appendix was cleanly removable. In this class of cases, he had come to use minimal drainage in the form of a small cigarette to the appendical site or no peritoneal drainage at all, contenting himself with draining the external

wound only and allowing the peritoneum to take care of itself. Dr. Hotchkiss said he had tried all the various forms of treatment from the wide incision, evisceration, and gauze drainage, down to his present method of the small McBurney incision, development of the appendix by touch rather than by sight, irrigation with saline solution of the peritoneal cavity, when the pus was generally distributed, and avoiding all unnecessary traumatism to the intestines from handling and exposure. Under this plan he had reported one series of 72 cases in a period extending over the same time as Dr. Stimson's cases, a smaller series to be sure, but still including 15 cases of diffuse suppurative peritonitis, and without any mortality. In the paper read before the society in 1906, he had reported 28 cases of diffuse suppurative peritonitis treated by this method, of which 5 died.

Dr. Joseph A. Blake, after referring to the extremely favorable results in the series of cases reported by Dr. Stimson, said that in his opinion the McBurney incision was the best for most cases, and much better for the purpose of drainage than an incision along the outer border of the rectus. In regard to drainage *versus* non-drainage in peritonitis, he did not think it wise to wholly uphold either one stand or the other. While many cases could be safely left without drainage, there were some in which we could not well get along without it. One of the chief advances that had been made in the treatment of these cases was not in leaving out drainage altogether, but in relieving the surgeon of the necessity of making multiple incisions and in inserting large pieces of gauze or drainage tubes. Drainage was certainly indicated in dealing with a condition of local necrosis, but even then rarely more than one drain was necessary, inserted either to the iliac fossa or to the bottom of the pelvis. The speaker thought it took considerable experience and judgment to decide whether drainage could be safely omitted or not, and in doubtful cases he thought it better to err on the side of safety and introduce a drain. Personally, he always used a drain through the abdominal wall, but he had largely done away with deep drainage.

Dr. Charles L. Gibson said he thought the age of the patient in these cases should be considered in connection with the mortality rate. He had come to expect young children with general peritonitis to recover, even with an apparently extensive infection, which would be apt to end fatally in an older individual.

In regard to drainage, the speaker said he felt that Dr. Stimson had re-established the subject on a sound, common-sense basis. One method of drainage which he had found very efficient and which contributed much to the comfort of the patient, was the use of a modified Mikulicz tampon made of perforated rubber dam, properly folded and placed, and filled with gauze. He regarded this superior to the ordinary cigarette drain.

DR. HOTCHKISS said that most of his cases were young, *i.e.*, under thirty; 2, however, were over forty, and 1 was a man of fifty-eight.

DR. STIMSON, in closing, said it had been a pleasure to hear so much testimony in favor of drainage, which was much more generally employed than he had supposed. As to the ages of his patients, to which Dr. Gibson had referred, he could only state approximately that among the 13 cases of general or extensive peritonitis included in his list, 3 were under the age of twelve years, or that 2 others were under twenty.

In speaking of drainage in general peritonitis, Dr. Stimson said he was quite ready to concede that good results could be obtained with less drainage than he had deemed advisable, but he wished to take exception to the statement that a drain in this region did not drain, and that it would always be prevented from doing so by adhesions forming in the course of a few hours, which would render it useless. On the contrary, he had seen these drainage tubes discharge freely for three or four days, in amounts far too large, he thought, to be supplied solely by the area immediately surrounding the drain.

Dr. Stimson said that one of the chief objects of his paper was to emphasize his objection to the use of free and multiple incisions in these cases, laying open the abdomen widely with the idea of getting rid of every trace of exudate. He had a horror of that method, especially on account of its late results, such as the occurrence of ventral hernia, the relaxation of the abdominal wall and the general disability of the patient. While these patients perhaps escaped with their lives, yet many of them were practically cripples.

In dealing with limited suppurations, the speaker said he saw no reason for immediate closure of the wound. By doing that, a certain number of these patients would have their lives imperilled, and that risk could be avoided by the temporary use of a

drain running down to the site of the appendix, a measure which did not delay convalescence and introduced no additional risk of its own. The average stay in hospital after operation of the patients of the last three or four groups in his list was the same, whether the wounds were drained or not drained.

CYSTIC SARCOMA OF THE KIDNEY IN AN INFANT.

DR. GEORGE WOOLSEY showed a specimen which he had removed in February, 1907, from an infant four months old. At the time of its removal, it was larger than the child's head. It had first been noticed about a month after birth, and steadily increased in size until it filled about one-half of the abdomen, especially on the left side. It gave rise to no urinary symptoms, and it was not until shortly before the time of operation that symptoms from pressure on the thoracic organs became marked.

Its removal was accomplished without much difficulty except for its adhesion to the peritoneum below the transverse mesocolon, which was torn. It was found to consist of the left kidney, or its posterior half, from the front of which extended the tumor which was entirely cystic. Many of the superficial cysts had been ruptured during the removal. A pathological examination of the tumor, made by Dr. James Ewing, showed that it contained both sarcomatous and epithelial elements. He found none of the striped muscle tissue that was sometimes present in these mixed tumors (embryomata). The patient died of shock on the day of the operation.

DISLOCATION OF THE SEMILUNAR AND FRACTURE OF THE CARPAL SCAPHOID.

DR. LEWIS A. STIMSON showed a specimen obtained from a man of thirty years who fell a distance of about 25 feet, sustaining a fracture of the pelvis and an injury to the left wrist, the latter consisting of a forward dislocation of the semilunar bone and a fracture of the scaphoid. The wrist joint was very movable, and there was abundant crepitus, with sensitiveness on pressure. The diagnosis was corroborated by the X-ray, and the semilunar and proximal fragment of the scaphoid were extirpated. Motion in the wrist is now limited but increasing.

DR. HAYNES spoke of some experiments in the dissecting room, where he had produced a fracture of the scaphoid by flex-

ing the wrist and then striking the dorsum of the hand a sharp blow with a heavy mallet. Shortly afterwards Dr. Downes reported to him a case where the injury had been produced by hyperextension.

DR. WILLIAM A. DOWNES said he had treated 4 cases of fracture of the carpal scaphoid this winter. In 1 of these the injury was produced with the hand in the hyperflexed position, and was probably produced by direct violence; and in the other 3 the hand was in a position of hyperextension.

REVIEWS OF BOOKS.

THE TECHNIC OF OPERATIONS UPON THE INTESTINES AND STOMACH. By ALFRED H. GOULD, M.D., of Boston, Mass. Large octavo, pp. 302. Philadelphia: W. B. Saunders Company, 1906.

This book is the result of experimental work, the aim of the author having been to study a mechanical subject in the only available way, *i.e.*, upon animals. Of the multitude of intestinal and stomach operations which have been suggested during recent years, only a limited number have proved of permanent value. In the slow and cautious methods demanded in operating upon human beings, his responsibility to the patient prevents the surgeon from trying to determine and to eliminate unnecessary technical steps.

The operations chosen for the experimental tests were those most used to-day, and with that as a basis, a discriminating and critical experimental study was carried out upon animals and the cadaver. In the course of the work a great many new details came up which proved to be of importance heretofore not appreciated.

The book deals essentially with the elementary details. It is a book about technic, and an understanding of the minutiæ which, combined, make up the operation. This means accurate technic.

The first chapter deals with repair. This is inserted to give the reader confidence that, if the work is done according to the rules laid down later, the healing of the intestines is bound to follow in fairly set grooves.

A great deal of attention is given to tying knots, suture material, stitches, needles, clamps, in order to show just how these are employed. This chapter leads naturally to a brief consideration of the anatomical questions which are involved in intestinal operations.

The completed gastric and intestinal operations are easily understood by one who has made himself familiar with the elementary matters.

Surgical teaching is undergoing a change. The success of the book depends upon the recognition of the source from which the data comes. It is not hearsay, it is a discriminating criticism of the work of others in which are introduced a good many new ideas; in one case the entire operation is original.

The illustrations are numerous and accurate; all possible details are cut out in order to focus the attention of the reader upon as small an area as possible. This has demanded an increased number of drawings, but in the end it has distinctly made for clearness. The number of drawings makes the text appear short, but the technical pictures in the text stand out as sharply as they do in the drawings.

LEWIS S. PILCHER.

A TEXT-BOOK OF DISEASES OF WOMEN. By J. CLARENCE WEBSTER, M.D.(Edin.), F.R.C.P.E., F.R.S.E., Professor of Obstetrics and Gynecology in Rush Medical College. Large octavo of 712 pages. Philadelphia and London: W. B. Saunders Company, 1907.

In the preface to this volume the author states that he has endeavored to keep constantly before him the following aims:

1. To give prominence to the scientific basis of each subject under consideration. For this purpose the most thorough attention has been given to modern researches in sectional and dissectional anatomy, histology, embryology, comparative anatomy, pathology and bacteriology, in so far as they bear on diseases of women, and the author has included the chief facts collected by himself in original investigations carried on during the past sixteen years.

2. To study clinical phenomena in their widest relationships.

3. To insist upon exercising caution in the adoption of therapeutic measures not yet thoroughly tested, especially of

certain ones which have, in recent years, been recklessly advocated.

4. To give emphasis to methods which have proved satisfactory in the author's experience.

The author has carried out his plans and has presented the entire subject as fully as the scope and size of the volume permits. The chapter on anatomy is particularly good, as it includes the results of the writer's own studies of this important part of the subject. The general plan of the work is excellent, beginning with the anatomy (including embryology), then puberty and menstruation, genital tract in relation to microörganisms, neuroses in relation to pelvic diseases, case-taking and physical examination, minor therapeutic measures and surgical technique. After this the various gynæcological conditions are considered, including a chapter on " Appendicitis in Relation to Pelvic Disease." The press-work is a very creditable specimen of book-making, and while the heavy glazed paper increases the weight of the book it adds to its general appearance and the clearness of the illustrations.

Two features which especially commend the book are the thorough presentation of the anatomy of the pelvis and the description of the methods of diagnosis and treatment (including operations) which have proven most serviceable in the hands of the writer.

JOHN A. SAMPSON.

ATLAS AND TEXT-BOOK OF HUMAN ANATOMY. Volume II. By Professor J. SOBOTTA, of Wurzburg. Edited, with additions, by J. PLAYFAIR MCMURRICH, A.M., Ph.D., Professor of Anatomy at the University of Michigan, Ann Arbor. Quarto volume of 194 pages, containing 214 illustrations, mostly all in colors. Philadelphia and London: W. B. Saunders Company, 1906.

Volume II of this " Atlas and Text-book of Human Anatomy " is equal in every way to Volume I, which has been recently reviewed in the ANNALS OF SURGERY. Volume I treats of the anatomy of the bones, ligaments, joints and muscles, while

Volume II is devoted entirely to the viscera, including the heart. Under this heading are included all the organs situated within the cavities of the body, so that the brain, spinal cord, heart, and even some of the organs of special sense, as the eye, are described under this designation. In treating the subject, the organs contained within the visceral tube of the body are grouped in three chief sub-divisions: (1) the digestive apparatus; (2) the respiratory apparatus; (3) the urogenital apparatus. Following out this sub-division, two particular constituents are recognized in each, viz., a tubular canal; and a series of non-tubular parenchymatous organs whose chief component constitutes the secreting epithelial substance of the glandular structures belonging to the individual apparatus. These are classified as sub-divisions. The volume is divided into a Treatise on General and Special Splanchnology, and a Treatise on General and Special Angiology. The volume is magnificently illustrated, the lithographs being true to life and not merely schematic, as is often the case in text-books and atlases of anatomy. The Anatomy and Text-book is a translation of the German edition by Dr. Johannes Sobotta, of the University of Wurtzburg, and is edited, with additions, by J. Playfair McMurrich, A.M., Ph.D., of the University of Michigan.

PAUL PILCHER.

A TEXT-BOOK OF HUMAN PHYSIOLOGY. By DR. ROBERT TIGERSTEDT, Professor of Physiology in the University of Helsingfors, Finland. Translated from the Third German Edition, and Edited by John R. Murlin, A.M., Ph.D., Assistant Professor of Physiology in the University and Bellevue Hospital Medical College, New York City. With an introduction to the English Edition by Professor Graham Lusk, Ph.D., F.R.S.(Edin.). Royal octavo, pp. xxxi, 751. New York and London: D. Appleton and Company, 1906.

The general excellence of Tigerstedt's "Lehrbuch der Physiologie des Menschen" and the high rank maintained by it as a medical text-book in Germany justify its translation, and for the labor involved in the undertaking Prof. Murlin de-

serves the gratitude of teaching physiologists in this country. This English edition is a somewhat abridged, but otherwise faithful rendering of the third German edition; the omitted portions being such as are not ordinarily included in the regular courses in physiology given in American medical colleges. Some additions have been made to the text by the American editor, and a number of illustrations of simpler or improved forms of apparatus inserted. The exclusion of the section dealing with body-movements, though in accord with the common omission of that portion of the subject from our medical-school courses in physiology, is scarcely commendable. Its inclusion would have increased the size of the book by no more than fifteen pages and rendered it quite equivalent to the original work. Inasmuch as the mechanics of joints and of animal movements is of considerable practical value—especially to the surgeon and neurologist—its neglect by teachers of physiology in this country is rather surprising. Aside, however, from this defect—and, perhaps, but few will consider it a defect—the book is admirably suited for general use as a text-book by medical students. The reviewer is aware of but one other text-book in English that is likely to compete with it, and of the two is inclined to give first place to Murlin's Tigerstedt.

J. C. CARDWELL.

A TEXT-BOOK ON THE PRACTICE OF GYNÆCOLOGY. For Practitioners and Students. By W. EASTERLY ASHTON, M.D., LL.D., Professor of Gynæcology in the Medico-Chirurgical College of Philadelphia. Third edition, thoroughly revised. Philadelphia and London: W. B. Saunders Company, 1906.

The earlier editions of Prof. Ashton's work have already received reviews in this journal. Naturally, the changes which have taken place during the year since its first appearance have not been extensive, but supplementary material has been added and some revisions have been made. The metric system has been introduced. Microscopic examination and diagnosis of curettings from the uterus; the blood, in relation to surgery; colonic lavage as a treatment of constipation; and the treatment

of vaginismus, are subjects which have been revised and rewritten. It is worthy of note that the superficial denudations for the cure of cystocele have been discarded and Dudley's method of operating has been substituted. The numerous methods for the correction of chronic retro-displacements of the uterus show the unsatisfactory results of our present operative treatment. The subject of gonorrhœa in the female has not received the consideration which it deserves and leaves the reader at a loss as to the best method for its treatment. The three editions within one year speak well for the popularity of the work.

PAUL PILCHER.